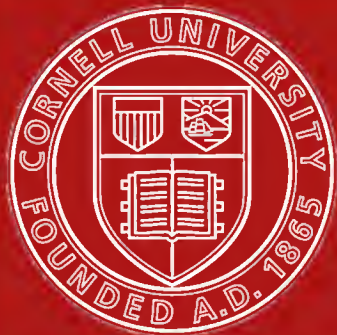


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DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

E. DANA DURAND, DIRECTOR

APPOINTED JUNE 16, 1909; RESIGNED JUNE 30, 1913

WM. J. HARRIS, DIRECTOR

APPOINTED JULY 1, 1913

THIRTEENTH CENSUS OF THE UNITED STATES
TAKEN IN THE YEAR 1910

VOLUME X

MANUFACTURES
1909

REPORTS FOR PRINCIPAL INDUSTRIES

PREPARED UNDER THE SUPERVISION OF WILLIAM M. STEUART
CHIEF STATISTICIAN FOR MANUFACTURES



WASHINGTON
GOVERNMENT PRINTING OFFICE

1913
5

DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
WASHINGTON

ANNOUNCEMENT CONCERNING THIRTEENTH CENSUS REPORTS.

DECEMBER 1, 1913.

All of the volumes of the final census reports have been issued except Volume IV, Occupation Statistics, which will be completed at an early date.

The volumes numbered I to XI, constituting the complete reports of the census, are being issued in a very limited edition, intended chiefly for libraries, institutions, and special students of statistics.

A condensed report, entitled Abstract of the Census, has been printed in a much larger edition, intended for more general distribution, and prepared in such a way as to meet the need of most persons desiring information concerning the results of the census. It contains in tabular form all important census statistics for the United States as a whole and for each state and principal city, together with a brief text explaining the figures and their meaning. The Abstract therefore is a condensation of the complete census reports, both tables and text, and not merely a compilation of tables.

The Abstract is issued in special editions for each of the several states, each edition containing a supplement giving the detailed statistics for counties, cities, and other civil divisions of the state to which it relates, designed to meet the needs of persons resident in that state or especially interested in it. The supplement contains also both tables and text.

As a compact reference work of general and local interest the Abstract is more convenient for most persons than the voluminous final reports.

LETTER OF TRANSMITTAL.

DEPARTMENT OF COMMERCE,
BUREAU OF THE CENSUS,
Washington, D. C., December 1, 1913.

SIR:

I have the honor to transmit herewith Volume X of the Reports of the Thirteenth Decennial Census, relating to manufactures.

The census of manufactures was taken in conformity with "An act authorizing the taking of the Thirteenth and subsequent Decennial Censuses," approved July 2, 1909. The statistics were collected during the year 1910, but relate in general to the year ending December 31, 1909. The field work was done for the most part by clerks detailed from the permanent force of the bureau and by special agents appointed expressly for the purpose of collecting statistics of manufactures and mines.

The results of the manufactures census are contained in three volumes, constituting Volumes VIII, IX, and X of the Reports of the Thirteenth Decennial Census. Volume VIII contains a summarization of the statistics by industries and by states, together with a general analysis and discussion. Volume IX contains a separate report on the manufactures of each state and territory, each such report having previously been issued as a bulletin. Volume X, the present volume, contains special reports or monographs relating to the leading individual industries, which are also published as a series of separate bulletins. This volume also presents statistics for the manufacturing industries in the 13 principal metropolitan districts of the country.

The collection and compilation of the statistics of manufactures and the preparation of the text of the present volume have been under the supervision of William M. Steuart, chief statistician for manufactures, in accordance with plans prepared by my predecessor, Hon. E. Dana Durand.

The chiefs of division under Mr. Steuart during the Thirteenth Census period were Joseph D. Lewis and Frank L. Sanford.

Respectfully,


Director.

HON. WILLIAM C. REDFIELD,
Secretary of Commerce.

CONTENTS.

SUMMARY OF INDUSTRIES.

	Page.
AGRICULTURAL IMPLEMENTS.....	321
AUTOMOBILES, INCLUDING BODIES AND PARTS.....	807
BICYCLES, MOTORCYCLES, AND PARTS.....	825
BEEF SUGAR (<i>see</i> SUGAR).	
BONE, CARBON, AND LAMP BLACK.....	553
BOOKBINDING AND BLANK-BOOK MAKING (<i>see</i> PRINTING AND PUBLISHING).	
BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS.....	697
BOXES, WOODEN PACKING (<i>see</i> LUMBER AND TIMBER PRODUCTS).	
BRICK AND TILE (<i>see</i> CLAY PRODUCTS).	
BUTTER, CHEESE, AND CONDENSED MILK.....	357
CANNING AND PRESERVING: FISH; FRUITS AND VEGETABLES; PICKLES, PRESERVES, AND SAUCES.....	381
CARPETS AND RUGS, OTHER THAN RAG.....	120
CARRIAGES AND WAGONS AND MATERIALS.....	831
CHEMICALS AND ALLIED PRODUCTS.....	529
CHEMICALS, GENERAL.....	531
CLAY PRODUCTS.....	849
COKE.....	627
CORDAGE AND TWINE AND JUTE AND LINEN GOODS.....	175
COTTON GOODS, INCLUDING COTTON SMALL WARES.....	37
DYEING AND FINISHING TEXTILES.....	187
DYESTUFFS AND EXTRACTS.....	559
ELECTRICAL MACHINERY, APPARATUS, AND SUPPLIES.....	283
ENGRAVING, STEEL AND COPPER PLATE, INCLUDING PLATE PRINTING (<i>see</i> PRINTING AND PUBLISHING).	
EXPLOSIVES.....	567
FELT GOODS (<i>see</i> WOOLEN, WORSTED, AND FELT GOODS, AND WOOL HATS).	
FERTILIZERS.....	575
FLOUR-MILL AND GRISTMILL PRODUCTS.....	405
GAS, ILLUMINATING AND HEATING.....	637
GLASS.....	875
GLOVES AND MITTENS, LEATHER.....	737
GLUCOSE AND STARCH.....	429
HAND-KNIT GOODS (<i>see</i> HOSIERY AND KNIT GOODS).	
HATS, FUR-FELT.....	141
HATS, WOOL (<i>see</i> WOOLEN, WORSTED, AND FELT GOODS, AND WOOL HATS).	
HOSIERY AND KNIT GOODS.....	67
ICE, MANUFACTURED.....	437
IRON AND STEEL.....	205
BLAST FURNACES.....	208
STEEL WORKS AND ROLLING MILLS.....	228
WIRE.....	262
TIN PLATE AND TERNEPLATE.....	272
JUTE AND JUTE GOODS (<i>see</i> CORDAGE AND TWINE AND JUTE AND LINEN GOODS).	
LAUNDRIES, STEAM.....	887
LEATHER, TANNED, CURRIED, AND FINISHED.....	717
LINEN GOODS (<i>see</i> CORDAGE AND TWINE AND JUTE AND LINEN GOODS).	
LITHOGRAPHING (<i>see</i> PRINTING AND PUBLISHING).	
LUMBER AND TIMBER PRODUCTS.....	487
MUSICAL INSTRUMENTS, PIANOS AND ORGANS AND MATERIALS.....	511
NETS AND SEINES (<i>see</i> CORDAGE AND TWINE AND JUTE AND LINEN GOODS).	
OIL, ESSENTIAL.....	589
OILCLOTH AND LINOLEUM.....	197
PAINT AND VARNISH.....	595
PAPER AND WOOD PULP.....	749
PETROLEUM, REFINING.....	657
PHONOGRAPHS AND GRAPHOPHONES.....	524
PICKLES, PRESERVES, AND SAUCES (<i>see</i> CANNING AND PRESERVING).	
POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS (<i>see</i> CLAY PRODUCTS).	

PRINTING AND PUBLISHING (BOOK AND JOB; MUSIC; NEWSPAPERS AND PERIODICALS; BOOKBINDING; ENGRAVING, STEEL, ETC.; LITHOGRAPHING).....	Page. 765
RICE, CLEANING AND POLISHING.....	453
SALT.....	463
SAUSAGE (see SLAUGHTERING AND MEAT PACKING).....	
SHIPBUILDING, INCLUDING BOAT BUILDING.....	301
SHODDY.....	132
SILK AND SILK GOODS, INCLUDING THROWSTERS.....	149
SLAUGHTERING AND MEAT PACKING.....	333
SOAP.....	667
STARCH (see GLUCOSE AND STARCH).....	
SUGAR.....	471
BET SUGAR.....	472
CANE SUGAR.....	478
SUGAR REFINING, NOT INCLUDING BET SUGAR.....	481
SULPHURIC, NITRIC, AND MIXED ACIDS.....	609
TIN PLATE AND TERNEPLATE (see IRON AND STEEL).....	
TURPENTINE AND ROSIN.....	679
VARNISH (see PAINT AND VARNISH).....	
WIRE (see IRON AND STEEL).....	
WOOD DISTILLATION, NOT INCLUDING TURPENTINE AND ROSIN.....	619
WOOL PULLING.....	138
WOOL SCOURING.....	138
WOOLEN, WORSTED, AND FELT GOODS, AND WOOL HATS.....	93

INTRODUCTION AND DEFINITION OF TERMS.

Introduction.....	Page. 19	Definition of terms—Contd.	Page.
Definition of terms.....	19	Materials.....	21
Scope of census: Factory industries.....	19	Expenses.....	21
Period covered.....	19	Value of products.....	21
The establishment.....	19	Value added by manufacture.....	21
Classification by industries.....	19	Cost of manufacture and profits.....	21
Influence of increased prices.....	20	Primary horsepower.....	21
Persons engaged in manufacturing industries.....	20	Laundries.....	21
Prevailing hours of labor.....	20	Custom sawmills and gristmills.....	21
Capital.....	20		

SPECIAL REPORTS ON SELECTED INDUSTRIES.

COMBINED TEXTILES.		COTTON MANUFACTURES—Contd.	
General statistics.....	Page. 25	General statistics for the industry as a whole—Contd.	Page.
Summary for 1909.....	25	Diagrams—	
Comparison with earlier censuses.....	26	Value of products for the most important states: 1909 and 1899.....	39
Persons engaged in the combined textile industry.....	27	Value of products, by states: 1909.....	39
Prevailing hours of labor.....	28	Persons engaged in the industry.....	40
Character of ownership.....	28	Summary, 1909.....	40
Engines and power.....	28	Wage earners classified according to nature of employment.....	41
Special statistics relating to materials and equipment.....	29	Wage earners employed, by months.....	42
Raw fibers used.....	29	Prevailing hours of labor.....	43
Yarns purchased.....	30	Character of ownership.....	43
Total production and consumption of cotton and woolen yarns.....	31	Size of establishments.....	44
Production, imports, exports, and consumption of raw fibers.....	31	Classification by value of products.....	44
Producing spindles.....	33	Classification by number of wage earners.....	45
Looms.....	34	Expenses.....	45
COTTON MANUFACTURES.		Engines, power, and fuel.....	46
General statistics for the industry as a whole.....	37	Engines and power.....	46
Scope of the industry.....	37	Fuel consumed.....	47
Summary for the industry.....	37	Special statistics relating to materials, products, equipment, etc.....	47
Comparison with earlier censuses.....	37	Materials.....	47
Summary, by states.....	38	Summary for the United States.....	47
		Materials used, by states.....	48
		Consumption of cotton, by states.....	49

COTTON MANUFACTURES—Contd.		Page.	THE WOOLEN INDUSTRY.		Page.
Special statistics relating to materials, etc.—Contd.			(Woolen, Worsted, and Felt Goods, and Wool Hats.)		
Products.....		50	General statistics.....		93
Summary for the United States.....		50	General summary.....		93
Products, by states.....		52	Scope of the industry.....		93
Production of yarns.....		54	Summary for the four branches of the industry: 1909.....		93
Equipment.....		55	Comparative statistics for the woolen industry, including the manufacture of carpets and rugs.....		94
Spindles.....		55	Summary, by states.....		95
Looms.....		57	Persons engaged in the industry.....		95
Relation of spindles and looms to wage earners and cotton consumption.....		58	Summary: 1909.....		95
Dyeing and finishing and contract work.....		59	Wage earners classified according to nature of employment.....		96
Special statistics for the cotton small-wares branch of the industry.....		60	Wage earners employed, by months.....		98
Summary, by states.....		60	Prevailing hours of labor.....		98
Materials.....		60	Character of ownership.....		99
Products.....		61	Size of establishments.....		99
Spindles and looms.....		61	Classification by value of products.....		99
Imports and exports of cotton and cotton goods.....		62	Classification by number of wage earners.....		100
Detailed state tables.....		62	Expenses.....		100
Comparative statistics, by states: 1909, 1904, and 1899.....		63	Engines, power, and fuel.....		101
Detailed statistics, by states: 1909.....		64	Engines and power.....		101
			Fuel consumed.....		102
THE HOSIERY AND KNIT GOODS INDUSTRY.			Special statistics relating to materials, products, and equipment.....		102
General statistics.....		67	Materials.....		102
Scope of the industry.....		67	Summary for the industry as a whole.....		102
Comparison with earlier censuses.....		67	Summary for the woolen goods and worsted goods branches.....		103
Summary by states.....		68	Summary for the felt goods branch of the industry.....		104
Diagrams—			Summary for the wool-hat branch of the industry.....		104
Value of products for the most important states: 1909 and 1899.....		69	Materials used in the woolen industry, by states.....		104
Distribution of the value of products: 1909.....		69	Wool used in the woolen industry.....		106
Persons engaged in the industry.....		70	Fibers used in the woolen industry.....		106
Summary: 1909.....		70	Supply of wool available for manufacture.....		107
Wage earners classified according to nature of employment.....		71	Imports of wool.....		107
Wage earners employed, by months.....		71	Products.....		108
Prevailing hours of labor.....		72	Summary for the United States: 1909.....		108
Character of ownership.....		72	Summary for the woolen goods and worsted goods branches of the industry.....		109
Size of establishments.....		73	Summary for the felt goods branch of the industry.....		112
Classification by value of products.....		73	Summary for the wool-hat branch of the industry.....		112
Classification by number of wage earners.....		74	Total production of yarns and shoddy in the woolen industry.....		112
Expenses.....		74	Products of the woolen industry as a whole, by states.....		113
Engines, power, and fuel.....		75	Equipment.....		114
Engines and power.....		75	Summary for the United States.....		114
Fuel consumed.....		76	Sets of cards.....		114
Special statistics relating to materials, products, and equipment.....		76	Combing machines.....		115
Materials.....		76	Spindles.....		115
Summary for the United States.....		76	Looms.....		116
Materials used, by states.....		77	Detailed state tables.....		117
Products.....		78	Comparative statistics, by states: 1909, 1904, and 1899.....		118
Summary for the United States.....		78	Detailed statistics, by states: 1909.....		119
Products, by states.....		80			
Principal products, by geographic divisions: 1909, 1904, and 1899.....		83	THE CARPET AND RUG INDUSTRY.		
Equipment.....		84	General statistics.....		120
Wool-combing machines.....		84	Scope of the industry.....		120
Cards and spindles.....		84	Comparative summary for the United States.....		120
Knitting machines.....		85	Summary, by states.....		121
Sewing machines.....		87	Persons engaged in the industry.....		121
Detailed state tables.....		87	Wage earners classified according to nature of employment.....		122
Comparative statistics, by states: 1909, 1904, and 1899.....		88	Wage earners employed, by months.....		123
Detailed statistics, by states: 1909.....		89			

THE CARPET AND RUG INDUSTRY—Contd.

	Page.
General statistics—Contd.	
Prevailing hours of labor.....	123
Character of ownership.....	123
Size of establishments.....	124
Expenses.....	124
Engines and power.....	125
Special statistics relating to materials, products, and equipment.....	125
Materials.....	125
Products.....	127
Equipment.....	129
Spindles.....	129
Looms.....	129
Detailed state tables.....	130
Comparative statistics, by states: 1909, 1904, and 1899....	130
Detailed statistics, by states: 1909.....	131

THE SHODDY INDUSTRY.

General statistics.....	132
Scope of the industry.....	132
Comparison with earlier censuses.....	132
Summary, by states.....	132
Persons engaged in the industry.....	133
Wage earners employed, by months.....	133
Prevailing hours of labor.....	134
Character of ownership.....	134
Size of establishments.....	134
Expenses.....	134
Engines and power.....	135
Fuel consumed.....	135
Special statistics relating to materials, products, and equipment.....	135
Materials.....	135
Products and equipment.....	135
Detailed state table.....	136
Detailed statistics, by states: 1909.....	137

WOOL PULLING AND WOOL SCOURING.

Wool pulling.....	138
Wool scouring.....	138

THE FUR-FELT HAT INDUSTRY.

Summary for the United States.....	141
Summary, by states.....	141
Persons engaged in the industry.....	141
Wage earners employed, by months.....	142
Prevailing hours of labor.....	142
Character of ownership.....	143
Size of establishments.....	143
Expenses.....	144
Engines and power.....	144
Fuel consumed.....	144
Special statistics regarding materials and products.....	144
Materials.....	144
Products.....	145
Detailed state tables.....	145
Comparative statistics, by states: 1909, 1904, and 1899....	146
Detailed statistics, by states: 1909.....	146

SILK MANUFACTURES.

General statistics.....	149
Scope of the industry.....	149
Summary for the industry: 1909.....	149
Comparison with earlier censuses.....	151
Summary, by states.....	152

SILK MANUFACTURES—Contd.

	Page.
General statistics—Contd.	
Persons engaged in the industry.....	153
Summary: 1909.....	153
Wage earners classified according to nature of employment.....	154
Wage earners employed, by months.....	156
Prevailing hours of labor.....	156
Character of ownership.....	157
Size of establishments.....	157
Classification by value of products.....	157
Classification by number of wage earners.....	158
Expenses.....	158
Engines, power, and fuel.....	158
Engines and power.....	158
Fuel consumed.....	159
Special statistics relating to materials, products, and equipment.....	160
Materials.....	160
Summary for the United States.....	160
Materials, by states.....	161
Consumption of silk in other textile industries.....	161
Raw silk thrown under contract.....	162
Imports.....	162
Products.....	162
Summary for the United States.....	162
Products, by states.....	164
Contract work.....	167
Equipment.....	167
Spindles.....	167
Looms and Jacquard machines.....	168
Detailed state tables.....	170
Comparative statistics, by states: 1909, 1904, and 1899....	170
Detailed statistics, by states: 1909.....	171

CORDAGE AND TWINE AND JUTE AND LINEN GOODS.

General statistics.....	175
Scope of the industry.....	175
Summary for the four branches of the industry.....	175
Comparative summary for the industry as a whole.....	175
Summary, by states.....	176
Persons engaged in the industry.....	177
Wage earners employed, by months.....	178
Character of ownership.....	179
Size of establishments.....	179
Expenses.....	180
Engines and power.....	181
Fuel consumed.....	181
Special statistics relating to materials and products.....	182
Materials.....	182
Products.....	182
Detailed state table.....	183
Detailed statistics, by states: 1909.....	183

THE DYEING AND FINISHING OF TEXTILES.

General statistics.....	187
Scope of the industry.....	187
Comparison with earlier censuses.....	187
Summary, by states.....	188
Persons engaged in the industry.....	189
Wage earners employed, by months.....	189
Prevailing hours of labor.....	190
Character of ownership.....	190
Size of establishments.....	191
Expenses.....	191
Engines and power.....	192
Fuel consumed.....	192

THE DYEING AND FINISHING OF TEXTILES—
Contd.

	Page.
Detailed state tables.....	193
Comparative statistics, by states: 1909, 1904, and 1899...	193
Detailed statistics, by states: 1909.....	194

THE OILCLOTH AND LINOLEUM INDUSTRY.

General statistics.....	197
Scope of the industry.....	197
Summary for the two branches of the industry.....	197
Comparison with earlier censuses.....	197
Summary, by states.....	198
Persons engaged in the industry.....	198
Wage earners employed, by months.....	198
Prevailing hours of labor.....	198
Character of ownership.....	199
Size of establishments.....	199
Expenses.....	199
Engines and power.....	199
Special statistics relating to products.....	200
Summary for the United States.....	200
Exports and imports.....	200
Detailed state table.....	201
Detailed statistics, by states: 1909.....	201

THE BLAST FURNACE, STEEL WORKS AND ROLLING MILL, WIRE, AND TIN-PLATE AND TERNEPLATE INDUSTRIES.

Part I.—THE GROUP AS A WHOLE.....	205
Relationship of the industries.....	205
Duplication in value of products and cost of materials...	205
Unit of measure.....	206
Number of industrial plants in the four industries.....	206
Part II.—BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED.....	206
The United States as a whole.....	206
Summary for the two industries combined.....	207
Part III.—BLAST FURNACES.....	208
General statistics.....	208
Description of the industry.....	208
Summary and comparison with earlier censuses.....	208
Geographic distribution.....	209
Diagrams—	
Blast furnaces—Location of establishments: 1909.....	209
Pig-iron production, by states: 1909.....	210
Summary, by states.....	210
Persons engaged in the industry.....	211
Wage earners employed, by months.....	211
Prevailing hours of labor.....	211
Character of ownership.....	212
Size of establishments.....	212
Expenses.....	213
Engines, power, and fuel.....	213
Special statistics relating to materials, products, and equipment.....	215
Materials used—Summary.....	215
Ore.....	215
Yield obtained from ore and other iron-bearing material.....	216
Total production of pig iron, by states.....	216
Diagram—Pig-iron production of leading states: 1909 and 1899.....	217
Production of pig iron, by kind of fuel used.....	218
Charcoal iron.....	218
Pig iron produced for consumption.....	219
Production of pig iron, by grades.....	219

THE BLAST FURNACE, STEEL WORKS AND ROLLING MILL, WIRE, AND TIN-PLATE AND TERNEPLATE INDUSTRIES—Contd.

Part III.—BLAST FURNACES—Contd.	Page.
Special statistics relating to materials, etc.—Contd.	
Production of pig iron, by method of delivery or casting.....	220
Dry-air blast.....	220
Number and capacity of furnaces.....	220
Maximum capacity per furnace.....	222
Slag pits.....	223
Pig-iron casting machines.....	223
Materials, products, and equipment in detail, by states.....	223
Blast furnaces—Detailed statistics of establishments, materials, products, and equipment, by states: 1909.....	223
Detailed state tables.....	226
Comparative statistics, by states: 1909, 1904, and 1899.....	226
Detailed statistics, by states: 1909.....	227
Part IV.—STEEL WORKS AND ROLLING MILLS.....	228
General statistics.....	228
Description of the industry.....	228
Summary and comparison with earlier censuses.....	228
Geographic distribution.....	229
Leading counties.....	229
Different classes of works.....	229
Diagram: Steel works and rolling mills—Location of establishments: 1909.....	230
Persons engaged in the industry.....	231
Summary, by states.....	231
Wage earners employed, by months.....	232
Prevailing hours of labor.....	233
Character of ownership.....	233
Size of establishments.....	233
Expenses.....	234
Engines and power.....	235
Fuel consumed in the industry.....	236
Special statistics relating to materials, products, and equipment.....	236
Materials.....	236
Products.....	237
Summary of products.....	237
Average values.....	240
Kinds of steel used in leading products.....	240
Production of finished rolled products and forgings, by states.....	240
Disposition of finished rolled products.....	241
Total production and disposition of unrolled and partly rolled products.....	242
Total production and disposition of scrap.....	242
Summary as to the disposition of products, and quantity and value of products in condition in which marketed.....	242
Manufactures from iron and steel rolling-mill products made in rolling mills.....	243
Wire and wire products made in rolling mills.....	243
Combined production of certain products in rolling mills and in other establishments.....	244
Copper rods.....	244
Products sold for export.....	244
Steel production.....	245
Summary.....	245
Production, by states.....	246
Production for consumption and for sale.....	246
Alloy steel.....	247

THE BLAST FURNACE, STEEL WORKS AND ROLLING MILL, WIRE, AND TIN-PLATE AND TERNEPLATE INDUSTRIES—Contd.

Part IV.—STEEL WORKS AND ROLLING MILLS—Contd.	
Special statistics relating to materials, etc.—Contd.	Page.
Capacity and equipment.....	247
Capacity of steel works.....	247
Open-hearth steel furnaces.....	247
Converters.....	248
Crucible steel furnaces.....	249
Electric and miscellaneous steel furnaces.....	249
Metal mixers.....	249
Hot rolls.....	249
Natural gas.....	250
Production of steel and finished rolled products and forgings, by states: 1909 and 1899.....	250
Diagrams—	
Steel production: 1909 and 1899.....	251
Finished rolled products and forgings: 1909 and 1899.....	251
Materials, products, and equipment in detail, by states.....	251
Steel works and rolling rolls—Detailed statistics of materials, products, and equipment, by states: 1909.....	252
Detailed state tables.....	260
Comparative statistics, by states: 1909, 1904, and 1899.....	260
Detailed statistics, by states: 1909.....	261
Part V.—THE WIRE INDUSTRY	
General statistics for the industry as a whole.....	262
Description of the industry.....	262
Summary for the wire industry as a whole.....	262
Size of establishment.....	263
Distribution of establishments, by states, according to character of business.....	263
General statistics for wire mills (establishments engaged primarily in drawing wire from purchased rods).....	264
Importance and growth of the industry.....	264
Summary, by states.....	264
Persons engaged in the industry.....	264
Wage earners employed, by months.....	265
Prevailing hours of labor.....	265
Character of ownership.....	265
Size of establishments.....	265
Engines, power, and fuel.....	266
Special statistics relating to materials, products, and equipment, for the industry as a whole.....	267
Materials.....	267
Products.....	267
Equipment—Wire-drawing blocks and nail and fence machines.....	269
Materials, products, and equipment, in detail, by states.....	269
The wire industry—Detailed statistics of number of establishments, materials, products, and equipment: 1909.....	270
Detailed state tables for wire mills using purchased rods.....	270
Comparative statistics, by states: 1909, 1904, and 1899.....	270
Detailed statistics, by states: 1909.....	272
Part VI.—THE TIN-PLATE AND TERNEPLATE INDUSTRY	
General statistics for the industry.....	272
Description of the industry.....	272
Black-plate and dipping industries combined.....	272
Black-plate mills.....	273
Tin-plate and terneplate dipping.....	273
Summary and comparison with earlier censuses.....	274
Persons engaged in the industry.....	274

THE BLAST FURNACE, STEEL WORKS AND ROLLING MILL, WIRE, AND TIN-PLATE AND TERNEPLATE INDUSTRIES—Contd.

Part VI.—THE TIN-PLATE AND TERNEPLATE INDUSTRY—Con.	
General statistics for the industry—Contd.	Page.
Wage earners employed, by months.....	275
Prevailing hours of labor.....	275
Character of ownership.....	275
Size of establishments.....	275
Expenses.....	275
Engines and power.....	276
Special data as to materials, products, and equipment of tin-plate and terneplate dipping establishments... ..	276
Materials.....	276
Products.....	277
Production compared with imports and exports.....	277
Dipping sets.....	278
Materials, products, and equipment, by states.....	278
Tin-plate and terneplate—Detailed statistics of number of establishments, materials, products, and equipment, by states: 1909.....	279
Detailed state tables.....	280
Comparative statistics, by states: 1909, 1904, and 1899.....	280
Detailed statistics, by states: 1909.....	280
ELECTRICAL MACHINERY, APPARATUS, AND SUPPLIES.	
General statistics.....	283
Comparison with earlier censuses.....	283
Summary, by states.....	283
Diagram: Electrical machinery, apparatus, and supplies—Value of products for leading states: 1909, 1904, and 1899.....	284
Persons engaged in the industry.....	284
Wage earners employed, by months.....	285
Prevailing hours of labor.....	286
Character of ownership.....	286
Size of establishments.....	286
Expenses.....	287
Engines and power.....	287
Fuel consumed.....	288
Special statistics relating to products.....	288
Dynamos.....	289
Transformers.....	289
Switchboards.....	290
Motors.....	290
Batteries.....	291
Electric lamps and lighting fixtures.....	292
Telegraph apparatus.....	293
Telephone apparatus.....	293
Insulated wire and cables.....	294
Electric measuring instruments.....	294
Miscellaneous electrical appliances.....	294
Detailed state tables.....	295
Comparative statistics, by states: 1909, 1904, and 1899.....	296
Detailed statistics, by states: 1909.....	297
SHIPBUILDING, INCLUDING BOAT BUILDING.	
General statistics of the industry.....	301
Scope and character of the industry.....	301
Summary for the United States: 1909.....	301
Comparison with earlier censuses.....	302
Government establishments.....	302
Summary, by states.....	303
Persons engaged in the industry.....	304
Wage earners employed, by months.....	304
Prevailing hours of labor.....	305

SHIPBUILDING, INCLUDING BOAT BUILDING—
Contd.

	Page.
General statistics of the industry—Contd.	
Character of ownership.....	305
Size of establishments.....	306
Expenses.....	307
Engines and power.....	308
Fuel consumed.....	309
Special data as to vessels launched, value of work done, and equipment.....	309
The United States as a whole.....	309
Number of vessels launched.....	309
Value of work done during census year.....	313
Dry docks and marine railways.....	313
Detailed state tables.....	314
Comparative statistics, by states: 1909, 1904, and 1899...	314
Detailed statistics, by states: 1909.....	316

THE AGRICULTURAL IMPLEMENT INDUSTRY.

General statistics.....	321
Scope of the industry.....	321
Comparison with earlier censuses.....	321
Summary, by states.....	322
Persons engaged in the industry.....	322
Wage earners employed, by months.....	323
Prevailing hours of labor.....	324
Character of ownership.....	324
Size of establishments.....	325
Classification by number of wage earners.....	325
Expenses.....	326
Engines and power.....	326
Fuel consumed.....	326
Special statistics relating to products.....	327
Principal classes of products, by states.....	327
Exports.....	328
Detailed state tables.....	328
Comparative statistics, by states: 1909, 1904, and 1899...	329
Detailed statistics, by states: 1909.....	330

SLAUGHTERING AND MEAT PACKING.

General statistics.....	333
Scope of the industry.....	333
Summary for the industry: 1909.....	333
Comparison with earlier censuses.....	334
Comparison with earlier censuses for the three branches of the industry.....	335
Summary, by states.....	335
Diagrams—	
Value of products for leading states: 1909 and 1899...	337
Value of products, by states: 1909.....	337
Persons engaged in the industry.....	338
Summary: 1909.....	338
Wage earners employed, by months.....	339
Prevailing hours of labor.....	339
Character of ownership.....	339
Size of establishments.....	340
Classification by value of products.....	340
Classification by number of wage earners.....	341
Expenses.....	341
Engines, power, and fuel.....	342
Engines and power.....	342
Fuel consumed.....	342
Special statistics relating to materials and products.....	343
Materials.....	343
Summary for the United States.....	343

SLAUGHTERING AND MEAT PACKING—Contd.

	Page.
Special statistics relating to materials and products—Contd.	
Total number of animals slaughtered for food.....	343
Animals slaughtered, by states.....	344
Animals slaughtered for food in wholesale and retail slaughterhouses and on farms and ranges, by states:	
1909.....	345
Products.....	346
Summary for the United States.....	346
Subsidiary products.....	347
Products, by states.....	347
Imports and exports.....	349
Detailed state tables.....	349
Comparative statistics, by states: 1909, 1904, and 1899...	350
Detailed statistics, by states: 1909.....	352

THE BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

General statistics.....	357
Summary for the three branches of the industry.....	357
Comparison with earlier censuses for the industry as a whole.....	358
Comparative statistics for the three branches of the industry: 1909 and 1904.....	358
Summary, by states.....	359
Diagrams—	
Butter, cheese, and condensed milk—Value of products for leading states: 1909 and 1899.....	360
Butter, cheese, and condensed milk—Value of products, by states: 1909.....	360
Persons engaged in the industry.....	361
Wage earners employed, by months.....	362
Prevailing hours of labor.....	363
Character of ownership.....	363
Establishments classified according to size.....	364
Expenses.....	366
Engines and power.....	366
Fuel consumed.....	367
Special statistics of materials and products.....	367
Quantity and value of principal materials used, by states: 1909.....	367
Milk and cream used in leading states: 1909, 1904, and 1899.....	369
Quantity of leading products, by states: 1909, 1904, and 1899.....	369
Quantity of leading products, by geographic divisions: 1909, 1904, and 1899.....	371
Quantity and value of products, by states: 1909.....	371
Quantity and value of products for the United States: 1909, 1904, and 1899.....	374
Detailed state tables.....	375
Comparative statistics, by states: 1909, 1904, and 1899...	375
Detailed statistics, by states: 1909.....	377

CANNING AND PRESERVING.

General statistics.....	381
Summary for the four branches of the industry: 1909....	381
Comparison with earlier censuses for the industry as a whole.....	381
Comparison with earlier censuses for the four branches of the industry.....	382
Summary, by states.....	383
Diagram: Canning and preserving—Value of products for leading states: 1909 and 1899.....	384
Persons engaged in the industry.....	384

CANNING AND PRESERVING—Contd.		Page.
General statistics—Contd.		
Wage earners employed, by months.....	386	
Prevailing hours of labor.....	386	
Character of ownership.....	387	
Size of establishments.....	388	
Expenses.....	389	
Engines and power.....	389	
Fuel consumed.....	390	
Special statistics as to products.....	390	
The United States as a whole.....	390	
Canned vegetables.....	392	
Canned fruits.....	392	
Dried fruits.....	392	
Canned fish and oysters.....	392	
Smoked fish.....	392	
Salted fish.....	392	
Value of products, by states.....	393	
Canned vegetables.....	393	
Canned fruits.....	393	
Dried fruits.....	393	
Canned fish and oysters.....	394	
Smoked fish.....	394	
Salted fish.....	394	
Detailed statistics of products, by states.....	395	
General statistics, by states.....	398	
Comparative statistics, by states: 1909, 1904, and 1899.....	398	
Detailed statistics, by states: 1909.....	400	
FLOUR-MILL AND GRISTMILL INDUSTRY.		
General statistics.....	405	
Summary for the United States: 1909.....	405	
Comparison with earlier censuses.....	406	
Summary for merchant mills.....	406	
Summary for merchant mills, by states.....	407	
Diagram: Merchant flour mills and gristmills—Value of products for leading states: 1909 and 1899.....	407	
Persons engaged, merchant mills.....	409	
Wage earners employed in merchant mills, by months.....	409	
Prevailing hours of labor in merchant mills.....	410	
Character of ownership in merchant mills.....	411	
Merchant mills classified according to size.....	412	
Expenses of merchant mills.....	413	
Engines and power.....	413	
Fuel consumed in merchant mills.....	414	
Special statistics of materials and products.....	414	
Summary for all mills.....	414	
Merchant mills, by states.....	416	
Grain ground in merchant flour mills and gristmills..	416	
Wheat flour and corn meal and corn flour produced by merchant flour mills and gristmills.....	417	
Other products of merchant flour mills and gristmills: 1909.....	418	
Classification of wheat-flour mills according to output.....	418	
Output of merchant mills producing 1,000 barrels or more of wheat flour in 1909.....	419	
Materials and products of feed mills.....	420	
Statistics for merchant mills manufacturing chiefly feed for live stock: 1909.....	420	
General statistics, by states.....	421	
Merchant flour mills and gristmills—Comparative statistics, by states: 1909, 1904, and 1899.....	421	
Detailed statistics, by states: 1909.....	424	
Custom flour mills and gristmills—Statistics, by states: 1909.....	426	

THE GLUCOSE AND STARCH INDUSTRY.		Page.
General statistics.....	429	
Summary for the industry: 1909.....	429	
Comparison with earlier censuses.....	429	
Persons engaged in the industry.....	430	
Wage earners employed, by months.....	431	
Prevailing hours of labor.....	431	
Character of ownership.....	431	
Size of establishments.....	431	
Expenses.....	432	
Engines and power.....	432	
Fuel consumed.....	432	
Special statistics relating to materials and products.....	432	
Materials.....	432	
Products.....	433	
Detailed state tables.....	433	
Detailed statistics, by states: 1909.....	434	

THE MANUFACTURED-ICE INDUSTRY.		Page.
General statistics.....	437	
Scope of the industry.....	437	
Comparison with earlier censuses.....	437	
Summary, by states.....	437	
Persons engaged in the industry.....	438	
Wage earners employed, by months.....	439	
Prevailing hours of labor.....	439	
Character of ownership.....	440	
Size of establishments.....	440	
Expenses.....	441	
Engines and power.....	441	
Fuel consumed.....	442	
Special statistics relating to materials, products, and methods of manufacture.....	442	
Materials.....	442	
Products.....	442	
Methods of manufacture.....	445	
Detailed state tables.....	445	
Comparative statistics, by states: 1909, 1904, and 1899.....	446	
Detailed statistics, by states: 1909.....	448	

RICE CLEANING AND POLISHING.		Page.
Scope of the industry.....	453	
Summary and comparison with earlier censuses.....	453	
General statistics, by states.....	454	
Comparative summary, by states: 1909, 1904, and 1899.....	454	
Detailed statistics, by states: 1909.....	455	
Persons engaged in the industry.....	455	
Character of ownership.....	456	
Establishments classified according to size.....	456	
Expenses.....	456	
Engines and power.....	456	
Fuel.....	457	
Materials and products.....	457	
Equipment and capacity.....	458	
Hawaii.....	459	
Materials and products.....	459	

THE MANUFACTURE OF SALT.		Page.
General statistics.....	463	
Scope of the industry.....	463	
Comparison with earlier censuses.....	463	
Summary, by states.....	463	
Persons engaged in the industry.....	464	
Wage earners employed, by months.....	464	
Prevailing hours of labor.....	464	

THE MANUFACTURE OF SALT—Contd.

General statistics—Contd.	Page.
Character of ownership.....	465
Size of establishments.....	465
Expenses.....	465
Engines and power.....	465
Fuel consumed.....	466
Special statistics relating to products and processes.....	466
Summary for the United States.....	466
Detailed state table.....	467
Detailed statistics, by states: 1909.....	467

THE SUGAR INDUSTRY.

Summary for the three industries combined: 1909.....	471
THE BEET SUGAR INDUSTRY.....	472
Scope of the industry.....	472
Comparative summary.....	472
Capacity of establishments.....	473
Persons engaged in the beet-sugar industry.....	473
Wage earners employed, by months.....	473
Character of ownership and size of establishment.....	474
Expenses.....	474
Engines and power and fuel consumed.....	474
Special statistics relating to acreage planted, materials, and products.....	474
Acreage planted and beets used.....	474
Methods of payment for beets purchased.....	476
Products.....	476
Detailed statistics for three groups of states.....	477
THE CANE SUGAR INDUSTRIES.....	477
The two industries combined.....	477
Comparative summary.....	477
The manufacture of sugar and sirup from cane.....	478
Detailed statistics for 1909.....	478
Persons engaged in the industry.....	478
Wage earners employed, by months.....	478
Prevailing hours of labor.....	479
Character of ownership.....	479
Size of establishments.....	479
Expenses.....	479
Engines and power.....	479
Fuel used.....	480
Materials used and products.....	480
The cane-sugar refining industry.....	481
Detailed statistics for 1909.....	481
Persons engaged in the industry.....	481
Wage earners employed, by months.....	481
Prevailing hours of labor.....	482
Character of ownership and size of establishments.....	482
Engines and power.....	482
Fuel consumed.....	482
The sugar industry in Hawaii.....	482
General description of the industry.....	482
Growth of the industry.....	482
Exports of sugar.....	483
The sugar industry in Porto Rico.....	483
Development of the industry.....	483
Summary for 1909.....	483
Exports of sugar.....	483

THE LUMBER INDUSTRY.

General statistics.....	487
Summary for the industry: 1909.....	487
Comparison with previous censuses.....	488
Summary, by states.....	490

THE LUMBER INDUSTRY—Contd.

General statistics—Contd.	Page.
Diagrams—	
Value of products for leading states: 1909 and 1899..	492
Value of products, by states: 1909.....	492
Persons engaged in the industry.....	493
Summary: 1909.....	493
Wage earners in logging camps and merchant sawmills: 1909.....	494
Wage earners in merchant establishments, by months.....	494
Prevailing hours of labor in merchant establishments.....	498
Character of ownership of merchant establishments.....	498
Size of merchant establishments.....	499
Classification by value of products.....	499
Classification by number of wage earners.....	500
Expenses.....	501
Engines, power, and fuel.....	501
Engines and power.....	501
Fuel consumed.....	502
Sawmill products.....	502
Detailed state tables.....	503
Merchant establishments—Comparative statistics, by states: 1909, 1904, and 1899.....	504
Detailed statistics, by states: 1909.....	506
Lumber industry, custom sawmills—Statistics, by states: 1909.....	508

THE MANUFACTURE OF MUSICAL INSTRUMENTS.

General statistics.....	511
The manufacture of pianos and organs and materials.....	511
Summary for the United States.....	511
Summary for the three branches of the industry: 1909.....	511
Comparison with earlier censuses.....	512
Summary, by states.....	512
Persons engaged in the industry.....	513
Summary: 1909.....	513
Comparison with previous censuses for the United States as a whole.....	514
Wage earners employed, by months.....	514
Prevailing hours of labor.....	515
Character of ownership.....	515
Size of establishments.....	516
Classification according to value of products.....	516
Classification according to number of wage earners... ..	516
Expenses.....	517
Engines, power, and fuel.....	517
Engines and power.....	517
Fuel consumed.....	518
Products.....	518
Production of pianos.....	518
Production of organs.....	518
Detailed state tables.....	520
Comparative statistics, by states: 1909, 1904, and 1899.....	520
Detailed statistics, by states: 1909.....	521
The manufacture of musical instruments and materials, other than pianos and organs.....	522
Musical instruments and materials, not specified—Detailed statistics, by states: 1909.....	523
THE PHONOGRAPH AND GRAPHOPHONE INDUSTRY.....	524

CHEMICALS AND ALLIED INDUSTRIES.

Introduction.....	529
Summary, for the nine industries.....	529
Comparison with earlier censuses for the group as a whole.....	529
Summary, by industries.....	529

THE GENERAL CHEMICAL INDUSTRY.

	Page.
General statistics.....	531
Scope of the industry.....	531
Comparison with earlier censuses.....	531
Summary, by states.....	532
Persons engaged in the industry.....	532
Summary: 1909.....	532
Wage earners employed, by months.....	533
Prevailing hours of labor.....	533
Character of ownership.....	533
Size of establishments.....	534
Classification, by value of products.....	534
Classification, by number of wage earners.....	534
Expenses.....	535
Engines, power, and fuel.....	535
Engines and power.....	535
Fuel consumed.....	536
Special statistics relating to materials and products.....	536
Materials.....	536
Summary for the United States.....	536
Materials, by states.....	536
Products.....	537
Summary for the United States.....	537
Products, by states.....	539
Individual groups of products.....	539
Group I. Acids.....	539
Group II. Sodas.....	540
Group III. Potashes.....	541
Group IV. Alums.....	542
Group V. Coal-tar products.....	542
Group VI. Cyanides.....	543
Group VII. Bleaching materials.....	544
Group VIII. Chemicals produced by the aid of electricity.....	544
Group IX. Plastics.....	545
Group X. Compressed and liquefied gases.....	546
Group XI. Fine chemicals.....	546
Group XII. Chemicals, not elsewhere specified.....	547
Detailed state tables.....	548
Comparative statistics, by states: 1909, 1904, and 1899 ..	549
Detailed statistics, by states: 1909.....	550

BONE, CARBON, AND LAMP BLACK.

Scope of the industry.....	553
Comparison with earlier censuses.....	553
Persons engaged in the industry.....	553
Wage earners employed, by months.....	553
Prevailing hours of labor.....	553
Character of ownership.....	554
Size of establishments.....	554
Expenses.....	554
Engines and power.....	554
Fuel consumed.....	554
Products.....	554
Detailed state table.....	555

DYESTUFFS AND EXTRACTS.

Scope of the industry.....	559
Summary and comparison with earlier censuses.....	559
Summary, by states.....	559
Persons engaged in the industry.....	560
Wage earners employed, by months.....	560
Prevailing hours of labor.....	560
Character of ownership.....	560
Size of establishments.....	561
Expenses.....	561

DYESTUFFS AND EXTRACTS—Contd.

	Page.
Engines and power.....	561
Fuel consumed.....	561
Materials and products.....	562
Detailed statistics, by states.....	563

THE MANUFACTURE OF EXPLOSIVES.

General statistics.....	567
Scope of the industry.....	567
Comparison with earlier censuses.....	567
Comparative summary, by states.....	567
Persons engaged in the industry.....	568
Wage earners employed, by months.....	568
Prevailing hours of labor.....	568
Character of ownership.....	569
Expenses.....	569
Engines and power.....	569
Fuel consumed.....	569
Special statistics relating to materials and products.....	569
Materials.....	569
Products.....	570
Detailed state table.....	571
Detailed statistics, by states: 1909.....	571

THE FERTILIZER INDUSTRY.

General statistics.....	575
Scope of industry.....	575
Summary and comparison with earlier censuses.....	575
Summary, by states.....	576
Diagrams:	
Value of products for leading states: 1909 and 1899...	577
Value of products, by states: 1909.....	577
Persons engaged in the industry.....	577
Wage earners employed, by months.....	578
Prevailing hours of labor.....	579
Character of ownership.....	579
Size of establishments.....	579
Expenses.....	580
Engines and power.....	580
Fuel consumed.....	581
Special statistics relating to materials and products.....	581
Materials used by establishments in the fertilizer in- dustry.....	581
Materials used by all establishments making fertilizers...	582
Products of all establishments making fertilizers.....	582
Products of establishments in the fertilizer industry.....	582
The fertilizer industry—Products by states: 1909....	583
Detailed state tables.....	583
Comparative statistics by states: 1909, 1904, and 1899 ..	584
Detailed statistics, by states: 1909.....	585

THE MANUFACTURE OF ESSENTIAL OILS.

Scope of the industry.....	589
Summary and comparisons with earlier censuses.....	589
Summary, by states.....	589
Persons engaged in the industry.....	589
Wage earners employed, by months.....	590
Prevailing hours of labor.....	590
Character of ownership.....	590
Size of establishments.....	590
Expenses.....	591
Engines and power.....	591
Fuel consumed.....	591
Materials and products.....	591
Detailed state table.....	592
Detailed statistics, by states: 1909.....	592

THE PAINT AND VARNISH INDUSTRY.

	Page.
General statistics.....	595
Scope of the classification.....	595
Comparison with earlier censuses.....	595
Summary, by states.....	596
Persons engaged in the industry.....	596
Wage earners employed, by months.....	597
Prevailing hours of labor.....	597
Character of ownership.....	598
Size of establishments.....	598
Expenses.....	599
Engines and power.....	599
Fuel consumed.....	600
Special statistics relating to materials and products.....	600
Materials.....	600
Products.....	601
Detailed state tables.....	603
Comparative statistics, by states: 1909, 1904, and 1899.....	604
Detailed statistics, by states: 1909.....	605

THE MANUFACTURE OF SULPHURIC, NITRIC, AND MIXED ACIDS.

General statistics.....	609
Scope of the industry.....	609
Comparison with earlier censuses.....	609
Summary, by states.....	610
Persons engaged in the industry: 1909.....	610
Wage earners employed, by months.....	610
Prevailing hours of labor.....	610
Character of ownership.....	611
Size of establishments.....	611
Expenses.....	611
Engines and power.....	611
Fuel consumed.....	611
Special statistics relating to materials and products.....	611
Materials.....	611
Products.....	612

WOOD DISTILLATION.

Scope of the industry.....	619
Comparison with earlier censuses.....	619
Summary, by states.....	619
Persons engaged in the industry.....	620
Wage earners employed, by months.....	620
Prevailing hours of labor.....	620
Character of ownership.....	620
Size of establishments.....	620
Expenses.....	621
Engines and power.....	621
Fuel consumed.....	621
Products.....	622
Distillation equipment.....	623
Detailed state table.....	623
Detailed statistics, by states: 1909.....	623

THE COKE INDUSTRY.

General statistics.....	627
Summary and comparison with earlier censuses.....	627
Summary, by states.....	627
Persons engaged in the industry.....	628
Wage earners employed, by months.....	629
Prevailing hours of labor.....	629
Character of ownership.....	629
Size of establishments.....	630
Expenses.....	630
Engines and power.....	631
Fuel consumed.....	631

THE COKE INDUSTRY—Contd.

	Page.
Special statistics relating to materials, products, and equipment.....	631
Materials used, for the United States as a whole.....	631
Products, for the United States as a whole.....	632
Materials, products, and equipment, by states.....	632
Detailed state tables.....	634
Comparative statistics, by states: 1909, 1904, and 1899.....	634
Detailed statistics, by states: 1909.....	634

THE MANUFACTURE OF GAS.

General statistics.....	637
Scope of the industry.....	637
Comparative summary for the United States.....	637
Summary, by states.....	638
Diagram: Gas, illuminating and heating—Value of products for leading states: 1909 and 1899.....	639
Persons engaged in the industry.....	639
Wage earners employed, by months.....	640
Prevailing hours of labor.....	641
Character of ownership.....	641
Establishments classified according to size.....	641
Expenses.....	642
Engines and power.....	643
Fuel consumed.....	644
Special statistics of materials, products, etc.....	644
The United States as a whole.....	644
Materials and products, by states.....	646
Detailed state tables.....	650
Comparative statistics, by states: 1909, 1904, and 1899.....	650
Detailed statistics, by states: 1909.....	652

PETROLEUM REFINING.

General statistics.....	657
Scope of the industry.....	657
Comparison with earlier censuses.....	657
Comparative summary, by states.....	657
Persons engaged in the industry.....	658
Wage earners employed, by months.....	659
Prevailing hours of labor.....	659
Character of ownership.....	660
Size of establishments.....	660
Expenses.....	660
Engines and power.....	661
Fuel consumed.....	661
Special data relating to materials, products, and equipment.....	662
Materials.....	662
Products.....	662
Exports of petroleum products.....	663
Equipment.....	664
Detailed state table.....	664
Detailed statistics, by states: 1909.....	664

THE SOAP INDUSTRY.

General statistics.....	667
Scope of the industry.....	667
Summary, by states.....	667
Persons engaged in the industry.....	668
Wage earners employed, by months.....	669
Prevailing hours of labor.....	669
Character of ownership.....	669
Size of establishments.....	670
Expenses.....	671
Engines and power.....	671
Fuel consumed.....	671

THE SOAP INDUSTRY—Contd.

	Page.
Special statistics relating to materials and products.....	672
Materials.....	672
Products.....	672
Detailed state tables.....	673
Comparative statistics, by states: 1909, 1904, and 1899..	674
Detailed statistics, by states: 1909.....	675

THE TURPENTINE AND ROSIN INDUSTRY.

General statistics.....	679
Scope of the report.....	679
Comparison with earlier censuses.....	679
Development of the industry.....	680
Summary, by states.....	680
Diagram—Value of products of the turpentine and rosin industry, by states: 1909.....	681
Persons engaged in the industry.....	681
Convict labor.....	682
Wage earners employed, by months.....	682
Prevailing hours of labor.....	682
Character of ownership.....	683
Establishments classified according to size.....	683
Expenses.....	684
Engines and power.....	684
Fuel consumed.....	685
Special data as to products, methods of production, etc.....	685
Products.....	685
Equipment and methods of operation.....	686
Crude gum distilled.....	688
Extent of turpentine operations.....	688
Comparison of box and cup systems.....	689
Timber land controlled by turpentine operators.....	689
The naval stores "factor".....	690
Inspection and grading.....	690
Method of establishing prices.....	691
Open and closed ports.....	691
Exports.....	691
General statistics, by states.....	693
Comparative statistics, by states: 1909, 1904, and 1899..	693
Detailed statistics, by states: 1909.....	694

THE BOOT AND SHOE INDUSTRY.

General statistics.....	697
Summary for the three branches of the industry: 1909...	697
Comparison with earlier censuses for the industry as a whole.....	697
Comparison with earlier censuses for the three branches of the industry.....	698
Custom and factory work.....	699
Specialization in the boot and shoe industry.....	699
Exports of boots and shoes.....	700
Summary, by states.....	700
Diagram: Boots and shoes, including cut stock and findings—Value of products, leading states: 1909 and 1899...	701
Summary for leading cities.....	701
Persons engaged in the industry.....	702
Summary: 1909.....	702
Sex and age distribution of wage earners, by states: 1909.....	702
Comparison with previous censuses, for the United States as a whole.....	703
Wage earners employed, by months.....	703
Prevailing hours of labor.....	704
Character of ownership.....	704
Establishments classified according to size.....	705
Classification according to value of products.....	705
Classification according to number of wage earners..	706

THE BOOT AND SHOE INDUSTRY—Contd.

	Page.
General statistics—Contd.....	
Expenses.....	706
Engines and power.....	707
Fuel consumed.....	708
Special statistics as to products.....	708
Production, by kinds.....	708
Production, by methods of manufacture.....	710
General statistics, by states.....	711
Detailed statistics, by states: 1909.....	712
Comparative statistics, by states: 1909, 1904, and 1899...	714

THE LEATHER INDUSTRY.

General statistics.....	717
Nature of the industry.....	717
Comparison with earlier censuses.....	717
Summary, by states.....	718
Persons engaged in the industry.....	719
Wage earners employed, by months.....	720
Prevailing hours of labor.....	720
Character of ownership.....	720
Size of establishments.....	721
Expenses.....	722
Engines and power.....	722
Fuel consumed in the industry.....	723
Special statistics of materials and products and custom work.....	724
Total number of hides and skins used by establishments in the leather industry and in other industries.....	724
Sources of hides and skins used.....	724
Purchased materials used in the leather industry proper.....	725
Value of products of all establishments, including those not assigned to the leather industry.....	725
Products of the leather industry proper.....	726
Contract work on materials furnished by others.....	727
Leather produced by establishments assigned to other industries.....	727
Imports and exports of leather.....	727
Quantity and cost of materials and quantity and value of products, by states.....	727
Leather, tanned, curried, and finished—Hides and skins used by establishments in the industry, not including those treated under contract for others not in the industry, by states.....	728
Leather, tanned, curried, and finished—Cost of materials other than hides and skins, by states: 1909...	728
Leather, tanned, curried, and finished—Products of establishments in the industry, not including contract work for others not in the industry, by states.....	729
Leather, tanned, curried, and finished—Stock tanned or curried and finished by establishments in the industry under contract for other establishments in the industry, by states.....	730
Leather, tanned, curried, and finished—Stock tanned and finished by establishments in the industry under contract for other establishments not in the industry, by states.....	730
General statistics, by states.....	731
Comparative summary, by states: 1909, 1904, and 1899..	731
Detailed statistics, by states: 1909.....	732

THE LEATHER GLOVE AND MITTEN INDUSTRY

General statistics.....	737
Comparison with earlier censuses.....	737
Summary, by states.....	737
Production in Fulton County, N. Y.....	738
Persons engaged in the industry.....	739
Wage earners employed, by months.....	739

THE LEATHER GLOVE AND MITTEN INDUSTRY—

Contd.

	Page.
General statistics—Contd.	
Prevailing hours of labor.....	740
Character of ownership.....	740
Size of establishments.....	740
Expenses.....	741
Engines and power.....	741
Special statistics as to products.....	742
Products, by states.....	744
Imports.....	744
Detailed statistics, by states.....	744
Comparative statistics, by states: 1909, 1904, and 1899...	745
Detailed statistics, by states: 1909.....	746

THE PAPER AND WOOD PULP INDUSTRY.

General statistics.....	749
Summary for the United States.....	749
Summary for the industry: 1909.....	749
Comparison with earlier censuses.....	749
Summary, by states.....	750
Persons engaged in the industry.....	751
Summary: 1909.....	751
Wage earners employed, by months.....	751
Prevailing hours of labor.....	752
Character of ownership.....	752
Establishments classified according to size.....	753
Classification by value of products.....	753
Classification by number of wage earners.....	753
Expenses.....	754
Engines, power, and fuel.....	754
Engines and power.....	754
Fuel consumed.....	755
Special data relating to materials, products, and equipment..	755
Materials.....	755
Summary for the United States.....	755
Pulp wood used.....	756
Wood pulp used.....	756
Materials, by states.....	757
Products.....	757
Summary for the United States.....	757
Products, by states.....	758
Equipment.....	760
Paper machines.....	760
Pulp-mill equipment.....	760
Imports and exports.....	760
Detailed state tables.....	760
Comparative statistics, by states: 1909, 1904, and 1899...	761
Detailed statistics, by states: 1909.....	762

PRINTING AND PUBLISHING.

General statistics.....	765
Summary for the United States.....	765
Summary for the industry: 1909.....	765
Related industries.....	766
Comparison with earlier censuses.....	767
Growth of different branches of the industry from 1899 to 1909.....	767
Summary, by states.....	769
The industry as a whole.....	769
Book and job printing.....	770
Music printing and publishing.....	770
Newspapers and periodicals.....	771
Bookbinding and blank-book making.....	772
Engraving, steel and copper plate, including plate printing.....	772
Lithographing.....	773

PRINTING AND PUBLISHING—Contd.

	Page.
General statistics—Contd.	
Persons engaged in the industry.....	773
Summary: 1909.....	773
Wage earners employed, by months.....	775
Prevailing hours of labor.....	775
Character of ownership.....	776
Size of establishments.....	777
Classification by value of products.....	777
Classification by number of wage earners.....	778
Expenses.....	779
Engines, power, and fuel.....	779
Engines and power.....	779
Fuel consumed.....	781
Special statistics relating to products.....	781
Summary for the industry as a whole.....	781
Summary for the printing and publishing industry proper.....	781
Book and job printing and publishing.....	784
Printing and publishing of music.....	785
Printing and publishing of newspapers and periodicals..	785
Distribution.....	786
Classification according to character.....	787
Classification according to language.....	787
Circulation of newspapers and periodicals in general.....	788
Circulation per 1,000 literate population.....	789
Period of issue.....	789
Dailies.....	789
Dailies in 10 leading cities.....	791
Language.....	792
Sunday newspapers and periodicals.....	793
Weeklies.....	794
Publications with miscellaneous periods of issue....	796
Triweeklies and semiweeklies.....	797
Monthlies.....	797
Quarterlies.....	798
‘All other’.....	798
Language.....	798
Detailed state tables.....	798
Comparative statistics, by states: 1909, 1904, and 1899...	799
Detailed statistics, by states: 1909.....	802

THE AUTOMOBILE INDUSTRY.

General statistics.....	807
Classification of establishments.....	807
Comparison with earlier censuses.....	807
Summary, by states.....	809
Diagrams—	
Value of products for leading states: 1909 and 1904...	810
Value of products, by states: 1909.....	810
Persons engaged in the industry.....	810
Wage earners employed, by months.....	811
Prevailing hours of labor.....	812
Character of ownership.....	812
Size of establishments.....	813
Expenses.....	814
Engines and power.....	814
Fuel consumed.....	815
Special statistics relating to products.....	815
Automobiles made, classified according to kind of propelling power.....	815
Automobiles made, classified according to use and type..	816
Automobiles made, classified according to motive power and type.....	817
Automobiles made, classified according to horsepower rating.....	817
Imports and exports.....	818

THE AUTOMOBILE INDUSTRY—Contd.		THE CLAY PRODUCTS INDUSTRIES—Contd.	
	Page.		Page.
Detailed state tables.....	818	Brick and tile industry—Contd.	
Comparative statistics, by states: 1909, 1904, and 1899...	819	Detailed state tables.....	857
Detailed statistics, by states: 1909.....	820	Comparative statistics, by states: 1909, 1904, and 1899.....	857
		Detailed statistics, by states: 1909.....	860
BICYCLES, MOTORCYCLES, AND PARTS.		Pottery, terra-cotta, and fire-clay products industry.....	862
Description of the industry.....	825	Comparison with earlier censuses.....	862
Comparison with earlier censuses.....	825	Summary, by states.....	862
Persons engaged in the industry.....	825	Persons engaged in the industry.....	863
Character of ownership.....	826	Wage earners employed, by months.....	863
Size of establishments.....	826	Prevailing hours of labor.....	864
Expenses.....	826	Character of ownership.....	864
Engines and power.....	826	Size of establishments.....	865
Fuel consumed.....	827	Expenses.....	866
Detailed statistics, by states.....	827	Engines and power.....	866
		Fuel consumed.....	867
THE CARRIAGE AND WAGON INDUSTRY.		Centralization of the manufacture of pottery.....	867
General statistics.....	831	Detailed state tables.....	868
Summary for the United States: 1909.....	831	Comparative statistics, by states: 1909, 1904, and 1899...	868
Comparison with earlier censuses.....	831	Detailed statistics, by states: 1909.....	870
Summary, by states.....	832	Special statistics relating to products for the clay industries combined.....	871
Persons engaged in the industry.....	833		
Diagrams—		THE MANUFACTURE OF GLASS.	
The carriage and wagon industry—Value of products for leading states: 1909 and 1899.....	834	General statistics.....	875
The carriage and wagon industry—Value of products, by states: 1909.....	834	Scope of the industry.....	875
Wage earners employed, by months.....	835	Comparison with earlier censuses.....	875
Prevailing hours of labor.....	835	Summary, by states.....	875
Character of ownership.....	836	Persons engaged in the industry.....	876
Size of establishments.....	837	Wage earners employed, by months.....	877
Expenses.....	837	Prevailing hours of labor.....	877
Engines and power.....	838	Character of ownership.....	878
Fuel consumed.....	839	Size of establishments.....	878
Special statistics regarding products.....	839	Expenses.....	879
The United States as a whole.....	839	Engines and power.....	879
Vehicles turned out, by states.....	841	Fuel consumed.....	880
Detailed statistics, by states.....	842	Special statistics relating to materials, products, and equipment.....	880
Comparative statistics, by states: 1909, 1904, and 1899...	843	Materials.....	880
Detailed statistics, by states: 1909.....	844	Products.....	880
		Equipment.....	881
THE CLAY PRODUCTS INDUSTRIES.		Imports and exports.....	882
General statistics.....	849	Detailed state tables.....	883
Scope of the classification.....	849	Comparative statistics, by states: 1909, 1904, and 1899...	883
Summary for the two industries combined.....	849	Detailed statistics, by states: 1909.....	884
Comparison with earlier censuses.....	849		
Brick and tile industry.....	850	STEAM LAUNDRIES.	
Comparison with earlier censuses.....	850	Scope of the statistics.....	887
Summary, by states.....	850	Persons engaged in the operation of laundries.....	888
Persons engaged in the industry.....	851	Prevailing hours of labor.....	889
Wage earners employed, by months.....	852	Wage earners employed, by months.....	890
Prevailing hours of labor.....	852	Character of ownership.....	890
Character of ownership.....	853	Steam laundries classified according to size.....	891
Size of establishments.....	854	Expenses of steam laundries.....	892
Expenses.....	855	Engines and power.....	893
Engines and power.....	855	Fuel consumed.....	894
Fuel consumed.....	856	Laundries in cities.....	894
		Detailed statistics, by states.....	897

STATISTICS OF MANUFACTURES FOR METROPOLITAN DISTRICTS.

	Page.		Page.
Statistics of manufactures for leading metropolitan districts...	903	Cleveland metropolitan district.....	945
Cities and their suburbs.....	903	Territory included.....	945
Method of defining districts.....	903	Map—Metropolitan district: 1909.....	944
Districts for which statistics are presented.....	903	Summary for the district.....	945
Comparison with earlier censuses.....	903	Comparison with earlier censuses.....	945
Summary of the statistics.....	904	Leading industries.....	946
Comparison with United States totals.....	904	Comparative summary, by industries.....	947
New York metropolitan district.....	907	Buffalo metropolitan district.....	949
Territory included.....	907	Territory included.....	949
Map—Metropolitan district: 1909.....	906	Map—Metropolitan district: 1909.....	950
Summary for the district.....	907	Summary for the district.....	949
Comparison with earlier censuses.....	909	Comparison with earlier censuses.....	950
Leading industries.....	910	Leading industries.....	951
Comparative summary, by industries.....	910	Comparative summary, by industries.....	953
Chicago metropolitan district.....	915	Detroit metropolitan district.....	954
Territory included.....	915	Territory included.....	954
Map—Metropolitan district: 1909.....	914	Map—Metropolitan district: 1909.....	954
Summary for the district.....	915	Summary for the district.....	955
Comparison with earlier censuses.....	916	Summary by industries.....	955
Leading industries.....	917	Cincinnati metropolitan district.....	957
Comparative summary, by industries.....	919	Territory included.....	957
Philadelphia metropolitan district.....	921	Map—Metropolitan district: 1909.....	957
Territory included.....	921	Summary for the district.....	958
Map—Metropolitan district: 1909.....	920	Comparison with earlier censuses.....	958
Summary for the district.....	921	Leading industries.....	959
Comparison with earlier censuses.....	922	Comparative summary, by industries.....	961
Leading industries.....	923	Baltimore metropolitan district.....	963
Comparative summary, by industries.....	926	Territory included.....	963
Pittsburgh metropolitan district.....	929	Map—Metropolitan district: 1909.....	962
Territory included.....	929	Summary for the district.....	963
Map—Metropolitan district: 1909.....	928	Comparison with earlier censuses.....	963
Summary for the district.....	929	Leading industries.....	964
Comparison with earlier censuses.....	930	Comparative summary, by industries.....	966
Leading industries.....	931	Minneapolis—St. Paul metropolitan district.....	967
Comparative summary, by industries.....	932	Territory included.....	967
Boston metropolitan district.....	933	Map—Metropolitan district: 1909.....	967
Territory included.....	933	Summary for the district.....	967
Map—Metropolitan district: 1909.....	935	Comparison with earlier censuses.....	968
Summary for the district.....	933	Leading industries.....	969
Comparison with earlier censuses.....	935	Comparative summary, by industries.....	970
Leading industries.....	936	San Francisco—Oakland metropolitan district.....	971
Comparative summary, by industries.....	937	Territory included.....	971
St. Louis metropolitan district.....	939	Map—Metropolitan district: 1909.....	971
Territory included.....	939	Summary for the district.....	971
Map—Metropolitan district: 1909.....	940	Comparison with earlier censuses.....	972
Summary for the district.....	939	Leading industries.....	973
Comparison with earlier censuses.....	941	Comparative summary, by industries.....	975
Leading industries.....	941		
Comparative summary, by industries.....	943		

MANUFACTURES—REPORTS ON SELECTED INDUSTRIES.

INTRODUCTION AND DEFINITION OF TERMS.

INTRODUCTION.

The statistics of manufactures for certain selected industries were published as separate bulletins as rapidly as the statistics were compiled. These bulletins are now collected in the present volume, forming Volume X of the reports of the Thirteenth Census. The figures in this volume may differ in some unimportant details from those given in the bulletins, for the reason that certain minor errors discovered in the bulletins as first published have been corrected.

The text of the report for each industry summarizes the general results of the census inquiry, presenting a series of special tables in which the most important figures printed in the general tables are given in convenient form.

At the end of the report for each industry are two general tables, as follows: First, a comparative presentation for 1909, 1904, and 1899 of the number of establishments and of persons engaged in the industry, primary power, capital, salaries and wages, cost of materials, value of products, and value added by manufacture, followed by a table giving statistics in detail by states for 1909.

DEFINITION OF TERMS.

In connection with the reports for the individual industries the explanations of the use of terms and the methods of compilation given in the paragraphs following should be borne in mind.

Scope of census: Factory industries.—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the data for these purposes, it is imperative that due attention should be given to the limitations of the figures, particularly in any attempt to derive from them figures purporting to show average wages, cost of production, or profits. These limitations are fully discussed in the general report on manufactures for the United States as a whole (Volume VIII of Thirteenth Census Reports) and need not be repeated here.

The census of 1909, like that of 1904, was confined by law to manufacturing establishments conducted under what is known as the factory system, excluding the neighborhood, household, and hand industries. Where statistics for 1899 are given, they have been reduced to a comparable basis by eliminating the latter classes of industries. The census did not cover establishments which were idle during the entire year, or had a value of products of less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions, or in governmental establishments, except those of the Federal Government. Reports were secured for establishments operated by the Federal Government, and the statistics for such establishments are presented in the reports for the industries for which they were reported, though they are not included in the industry totals.

Period covered.—The returns relate to the calendar year 1909, or the business year which corresponds most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

The establishment.—The term "establishment" comprises the factories, mills, or plants which are under a common ownership or control and for which one set of books of account is kept.

If, however, the plants constituting an establishment as thus defined were not all located within the same state, separate reports were secured in order that the figures for each plant might be included in the statistics for the state in which it was located. In some instances separate reports were secured for each of the different industries carried on in the same establishment.

Classification by industries.—The establishments were assigned to the several classes of industries according to their products of chief value. The value of products reported for a given industry may thus, on the one hand, include minor products very different from those covered by the industry designation, and, on the other hand, may not include the total product covered by this designation, because some part of this product may be made in establishments in which it is not the product of chief value.

Influence of increased prices.—In comparing figures for cost of materials, value of products, and value added by manufacture in 1909 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

Persons engaged in manufacturing industries.—At the censuses of 1899, 1904, and 1909 the following general classes of persons engaged in manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks, and (5) wage earners. In the reports for the censuses of 1904 and 1899 these five classes were shown according to the three main groups: (1) Proprietors and firm members, (2) salaried officials, clerks, etc., and (3) wage earners. The second group included the three classes of salaried officers of corporations, superintendents and managers, and clerks. In certain tables relating exclusively to the present census a somewhat different grouping is employed—that into (1) proprietors and officials, (2) clerks, and (3) wage earners. The first group includes proprietors and firm members, salaried officers of corporations, and superintendents and managers. In comparative tables covering the censuses of 1899 and 1904 it is of course necessary to group the figures for 1909 according to the classification that was employed in the earlier censuses.

At this census the number of persons engaged in the industries, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for December 15, or the nearest representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where conditions were exceptional, and particularly in the case of certain seasonal industries, such as canning and preserving, the December date could not be accepted as typical and an earlier date had to be chosen.

In the case of employees other than wage earners the number thus reported for December 15, or other representative day, has been treated as equivalent to the average for the year, since the number of employees of this class does not vary much from month to month in a given industry. In the case of wage earners the average is obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on December 15, or other representative day, a report was obtained of the number employed on the 15th of each month, without distinction of sex or age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers

reported each month by 12. The average thus obtained represents the number of wage earners that would be required to perform the work done if all were employed constantly during the entire year. Accordingly, the importance of any industry as an employer of labor is believed to be measured more accurately by this average than by the number employed at any one time or on a given day.

The totals by sex and age for the wage earners reported for the representative day for some seasonal industries, such as canning and preserving, are misleading, because the distribution of the wage earners by sex and age is materially different from that in most industries of more regular operation. In order to determine as nearly as possible the sex and age distribution of the average number of wage earners for a given industry, the per cent distribution by sex and age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year in the industry, to determine the average number of men, women, and children employed.

In 1899 and 1904 the schedule called for the average number of wage earners of each sex 16 years of age and over, and the average number under 16 years of age without distinction of sex, for each month, and these monthly statements were combined in an annual average. Comparatively few manufacturing concerns, however, keep their books in such way as to show readily the average number of men, women, and children employed each month. These monthly returns by sex and age were, in fact, largely estimates. It was believed that a more accurate and reliable sex and age distribution could be secured by taking as a basis of estimate the actual numbers employed on a single day.

Prevailing hours of labor.—The census made no attempt to ascertain the number of employees working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a limited number of employees might have hours differing from those of the majority. In the tables all the wage earners of each establishment are counted in the class within which the establishment itself falls. In most establishments, however, all or practically all the employees work the same number of hours, so that these figures give a substantially correct representation of the hours of labor in manufacturing industries.

Capital.—For reasons stated in reports of prior censuses the statistics of capital secured by the census canvass are so defective as to be of little value, except

as indicating very general conditions. The instructions on the schedule for securing capital were as follows:

The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises.

Materials.—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" includes fuel, rent of power and heat, mill supplies, and containers, as well as materials forming a constituent part of the product. Under the head of "Fuel" is included all fuel used, whether for heat, light, or power, or for the process of manufacture.

Expenses.—Under "Expenses" are included all items of expense incident to the year's business, except interest, whether on bonds or other forms of indebtedness, and allowances for depreciation.

Value of products.—The amounts given under this head represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold. Amounts received for work on materials furnished by others are included.

Value added by manufacture.—The value of products is not a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part of it, and often by far the larger part, represents the value of the materials used, which are the products of agriculture or mining or of other manufacturing industries. For many purposes, therefore, the best measure of the importance of different classes of industry is the value created by the manufacturing operations carried on within the industry. This value is obtained by deducting the cost of the

materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

There is a further statistical advantage which "value added by manufacture" has over gross value of products. In combining the value of products for all industries the value of products produced by one establishment and used as materials in another is duplicated, and the total, therefore, gives a greatly exaggerated idea of the wealth created. No such duplication is involved in the total "value added by manufacture."

Cost of manufacture and profits.—Census data do not show the entire cost of manufacture, and consequently can not be used to show profits. No account has been taken of interest and depreciation. Even if the amount of profit could be determined by deducting the expenses from the value of the products, the rate of profit on the investment could not properly be calculated, because of the very defective character of the returns regarding capital.

Primary horsepower.—This item represents the total primary power generated by the manufacturing establishments plus the amount of power, principally electric, rented by them from other concerns. It does not cover the electric power developed by the primary power of the establishments themselves, the inclusion of which would evidently result in duplication.

Laundries.—The census of 1909 was the first to include statistics of laundries. The reports are confined to establishments using mechanical power. The data are presented separately and are not included in the general total for manufacturing industries, since their inclusion would interfere with comparisons with prior censuses.

Custom sawmills and gristmills.—In order to make the statistics for 1909 comparable with those for 1904, the data for these mills have been excluded from all the tables presenting general statistics. Statistics for such establishments, however, are given in connection with the reports on lumber and timber products and flour mill and gristmill products, respectively.

COMBINED TEXTILES

COMBINED TEXTILES.

GENERAL STATISTICS.

The group of textile industries for which statistics are here presented comprises eight distinct industries, designated as follows: (1) "Cotton goods, including cotton small wares"; (2) "woolen, worsted, and felt goods, and wool hats"; (3) "carpets and rugs, other than rag"; (4) "hosiery and knit goods"; (5) "silk and silk goods, including throwsters"; (6) "cordage and twine and jute and linen goods"; (7) "shoddy"; and (8) "dyeing and finishing textiles." The statistics for each of these industries are presented in detail in subsequent chapters of this report. In addition, a separate presentation is made for the wool scouring and

the wool pulling industries, though none of the statistics for them have been included in the tables relating to the general textile group. This group of industries does not include the manufacture of rag carpets, hair-cloth, or fur-felt hats, which industries are presented in the general statistics of manufactures under classifications as follows: "Carpets, rag," "hats, fur-felt," and "haircloth."

Summary for 1909.—Table 1 presents a summary of the principal statistics relating to the eight industries constituting the combined textile group for the census of 1909.

	Total.	Cotton goods, including cotton small wares.	Woolen, worsted, and felt goods, and wool hats.	Carpets and rugs, other than rag.	Hosiery and knit goods.	Silk and silk goods, including throwsters.	Cordage and twine and jute and linen goods.	Shoddy.	Dyeing and finishing textiles.
Number of establishments.....	5,352	1,324	985	139	1,374	852	164	88	426
Persons engaged in the industry.....	915,858	387,771	175,176	34,706	136,130	105,238	27,214	2,320	47,303
Proprietors and firm members.....	3,522	377	732	134	1,134	664	80	83	318
Salaried employees.....	31,208	8,514	5,722	1,265	5,721	5,537	1,314	196	2,939
Wage earners (average number).....	881,128	378,880	168,722	33,307	129,275	99,037	25,820	2,041	44,046
Primary horsepower.....	2,099,050	1,296,517	362,209	38,553	103,709	97,947	78,549	13,320	107,746
Capital.....	\$1,841,242,131	\$322,237,529	\$430,578,574	\$75,627,010	\$163,641,171	\$152,158,002	\$76,020,366	\$6,886,825	\$114,092,654
Expenses.....	1,488,817,311	554,221,688	387,998,515	62,311,110	175,729,583	177,175,719	56,076,532	6,656,311	68,647,853
Services.....	384,522,370	147,270,903	82,523,776	17,745,092	52,431,680	46,097,364	10,995,545	1,196,376	26,261,634
Salaries.....	49,123,634	14,411,758	10,097,157	2,209,042	7,691,457	7,527,279	1,862,546	289,685	5,034,710
Wages.....	335,398,736	132,859,145	72,426,619	15,536,050	44,740,223	38,570,085	9,132,999	906,691	21,226,924
Materials.....	992,635,299	371,009,470	282,878,039	39,563,004	110,241,053	107,766,916	40,914,810	5,000,706	35,261,301
Miscellaneous.....	111,659,642	35,941,315	22,596,700	5,003,014	13,056,850	23,311,439	4,166,177	459,229	7,124,918
Value of products.....	1,684,636,499	628,391,813	435,978,553	71,188,152	200,143,527	196,911,667	61,019,986	7,446,364	83,556,432
Value added by manufacture (value of products, less cost of materials).....	692,001,200	257,382,343	153,100,519	31,625,148	89,902,474	89,144,751	20,105,176	2,445,658	48,295,131

In compiling the statistics for the eight industries named, each establishment has been classified according to its product of chief value. There is considerable overlapping among the different industries, but so far as possible the statistics of products common to two or more of the industries are assembled, in the chapter on the industry for which they constitute primary products, so as to show the total production of the given product in all industries combined. There is also considerable duplication in the cost of materials and value of products for some of the individual industries, and still more in the totals for the eight industries combined, by reason of the use of the products of one establishment or one industry as materials for other establishments or other industries. For example, some of the establishments classed under "cotton goods, including cotton small wares," make cotton yarn that is sold not only to other cotton mills but to establishments in other textile industries. The extent of this practice in the combined textile industry is shown by Table 10, which gives the statistics for yarns purchased. The combination of the value of

products of the yarn-producing mills with that of the establishments in which the yarn is used as a material obviously leads to duplication. Again, the products of the shoddy industry are almost wholly used as a material in the wool manufactures.

In considering the relative importance of the several textile industries it should be borne in mind that the differences among the industries with respect to the amount of duplication involved in the value of products render that standard somewhat inaccurate.

It is clear from the table, however, that on the basis of any standard of measurement the cotton goods industry is the most important. The cotton mills, including those making small wares, manufactured products in 1909 whose value represented 37.3 per cent of the total value of products for the eight textile industries combined, and gave employment to 43 per cent of the total number of wage earners reported. Cotton is the most important material used in the manufacture of hosiery and knit goods also, and these two cotton-using industries together contributed 49.2 per cent of the total value of products for the eight

textile industries and employed 57.7 per cent of the total number of wage earners.

The industry designated "woolen, worsted, and felt goods, and wool hats" is the second in importance of this group, contributing 25.9 per cent of the total value of products and giving employment to 19.1 per cent of the total number of wage earners. In the carpet and rug branch of the industry also the chief material

used is wool, and these two industries together gave employment to 22.9 per cent of the wage earners and contributed 30.1 per cent of the value of products for the textile group.

Comparison with earlier censuses.—Table 2 summarizes the statistics of the eight textile industries representing the combined industry for each census from 1889 to 1909, inclusive.

	COMBINED TEXTILES.							
	Number or amount.				Per cent of increase. ¹			
	1909	1904	1899	1889	1899-1909	1904-1909	1899-1904	1889-1899
Number of establishments.....	5,352	4,737	4,521	4,420	18.4	13.0	4.8	2.3
Persons engaged in the industry.....	915,858	770,512	(²)	(²)	18.9	-----	-----	-----
Proprietors and firm members.....	3,522	3,611	(²)	(²)	-----	-----	-----	-----
Salaried employees.....	31,208	24,372	17,024	(²)	83.3	28.0	43.2	-----
Wage earners (average number).....	881,128	742,529	664,429	520,196	32.6	18.7	11.8	(²)
Primary horsepower.....	2,099,050	1,623,403	1,310,834	831,730	60.1	29.3	23.8	57.6
Capital.....	\$1,841,242,131	\$1,351,451,715	\$1,049,636,201	\$772,673,605	75.4	36.2	28.8	35.8
Expenses.....	1,488,817,311	1,123,356,860	824,336,963	681,538,981	80.6	32.5	36.3	21.0
Services.....	384,522,370	283,376,354	233,602,184	182,165,458	64.6	35.7	21.3	28.2
Salaries.....	49,123,634	32,862,121	23,532,773	(²)	108.7	49.5	39.6	-----
Wages.....	335,398,736	250,514,233	210,069,411	(²)	59.7	33.9	19.3	-----
Materials.....	992,635,299	753,174,981	527,209,771	454,272,489	88.3	31.8	42.9	16.1
Miscellaneous.....	111,658,642	86,805,525	63,525,008	45,101,034	75.8	28.6	36.6	40.8
Value of products.....	1,684,636,499	1,225,686,444	940,052,688	768,357,254	79.2	37.4	30.4	22.3
Value added by manufacture (value of products less cost of materials).....	692,001,200	472,511,463	412,842,917	314,084,765	67.6	46.5	14.5	31.4*

¹ A minus sign (—) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

* Figures not strictly comparable.

In comparing the figures for value of products and cost of materials for the different censuses, it should be noted that the amount of duplication may have been greater relatively at one census than at another, though it is probable that no very great change has taken place. Fluctuations in prices have, however, affected these items materially, and the value added by manufacture as well, though in the latter instance perhaps to a less extent. The advance in prices during the decade 1899-1909 partly accounts for the fact that the percentages of increase in these three items during that decade were much higher than those for the decade 1889-1899. The number of wage earners and the primary horsepower, however, also increased somewhat more rapidly during the later than during the earlier decade.

The average value of products per establishment in 1889 was \$173,836; in 1899, \$207,930; in 1904, \$258,747; and in 1909, \$314,768; and the average value added by manufacture in 1889 was \$71,060; in 1899, \$91,317; in 1904, \$99,749; and in 1909, \$129,298. The average number of wage earners per establishment shows an increase from 118 in 1889 to 147 in 1899, 157 in 1904, and 165 in 1909.

Comparative statistics for each census year beginning with 1879, for each of the textile industries covered by this report and for the eight industries combined, are presented in Table 3. In this table, for comparative purposes, "carpets and rugs" have been combined with "woolen, worsted, and felt goods and wool hats" under the title of "wool manufactures."

During the period of 30 years covered by the table the combined value of the products of the establishments in the eight textile industries increased from \$572,253,099 in 1879 to \$1,684,636,499 in 1909, the latter figure being nearly three times as great as the former. The decade 1899-1909 shows the largest absolute gain, the increase in value of products for that period being \$744,583,811.

A large gain during the last decade is shown for each of the separate industries with the single exception of the shoddy industry. The number of wage earners employed in these textile industries in 1909 was over twice as great as the number in 1879—881,128, as compared with 405,744—this increase comparing very favorably with the increase noted above for value of products.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE COMBINED TEXTILE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total	881,128	100.0	742,529	100.0	664,429	100.0
16 years of age and over.....	809,702	91.9	668,588	90.0	594,090	89.4
Male.....	420,183	47.7	336,908	45.4	300,418	45.2
Female.....	389,519	44.2	331,680	44.7	293,672	44.2
Under 16 years of age.....	71,426	8.1	73,941	10.0	70,339	10.6

The proportion of the total formed by the several classes shows no great variation for the three census years, although there was an increase in the propor-

tion of men during each five-year period and a decrease in the proportion of children, the proportion of females 16 years of age and over remaining practically stationary.

Prevailing hours of labor.—In Table 6 the wage earners in the eight textile industries combined have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

INDUSTRY.	AVERAGE NUMBER OF WAGE EARNERS IN THE COMBINED TEXTILE INDUSTRY: 1909							
	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
Total	881,128	2,158	11,138	18,735	518,195	259,407	73,252	245
Cotton goods, including cotton small wares.....	378,880	304	2,879	571	190,998	119,226	64,687	215
Woolen, worsted, and felt goods and wool hats.....	168,722	423	1,092	1,102	119,728	45,800	1,075	2
Hosiery and knit goods.....	129,275	908	3,331	4,753	65,422	49,934	4,927	.....
Silk and silk goods, including throwsters.....	99,037	106	2,320	2,323	81,407	12,881	.....	.....
Dyeing and finishing textiles.....	44,046	107	1,102	398	28,172	12,639	1,628	.....
Carpets and rugs, other than rag.....	33,307	165	178	7,078	13,802	12,084	.....	.....
Cordage and twine and jute and linen goods.....	25,820	138	208	2,505	16,279	6,023	687	.....
Shoddy.....	2,041	5	28	5	387	1,320	268	28

Of the total number of wage earners, 516,195, or 58.6 per cent, were employed in establishments where the prevailing hours of labor were more than 54 but less than 60 hours per week, while 259,407, or 29.4 per cent, were employed where the prevailing hours were 60 per week. The two groups above named together included 88 per cent of the total number of wage earners, and these same hours of employment were the most common ones in each of the individual industries. The larger proportion of the wage earners employed more than 60 hours per week (68,819 out of a total of 73,497) were in the cotton mills and the hosiery and knitting mills of the South. Of the 68,819 wage earners, the cotton mills reported 64,844, or 94.2 per cent, and the hosiery and knitting mills, 3,975, or 5.8 per cent.

Character of ownership.—Table 7 presents statistics with respect to the character of ownership of the establishments in the eight textile industries combined.

In 1909, of the total number of establishments in the eight industries combined, 60.3 per cent were under corporate ownership, as compared with 54.3 per cent in 1904, while the value of products of these estab-

lishments represented 84.3 per cent of the total in 1909 and 80 per cent in 1904.

CHARACTER OF OWNERSHIP.	COMBINED TEXTILES.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	5,352	4,737	\$1,684,638,499	\$1,225,688,444
Individual.....	1,185	1,162	93,547,407	91,385,272
Firm.....	337	994	170,400,967	153,889,882
Corporation.....	3,226	2,572	1,420,451,343	980,648,804
Other.....	4	9	236,782	262,486
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	22.1	24.5	5.6	7.5
Firm.....	17.5	21.0	10.1	12.5
Corporation.....	60.3	54.3	84.3	80.0
Other.....	0.1	0.2	(1)	(1)

¹ Less than one-tenth of 1 per cent.

Engines and power.—The amount of power used in the textile industries was first reported at the census of 1869. Table 2 shows that the total amount of power increased from 831,730 horsepower in 1889 to 2,099,050 in 1909. Table 8 shows, for the eight textile industries combined, the statistics of power, as reported at the censuses of 1909, 1904, and 1899.

Table 8

POWER.	COMBINED TEXTILES.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	17,679	11,273	9,370	2,098,050	1,623,403	1,310,834	100.0	100.0	100.0
Owned.....	10,122	9,607	9,370	1,922,585	1,568,178	1,284,470	91.8	96.6	98.0
Steam.....	7,110	6,705	6,230	1,497,775	1,181,417	906,327	69.9	72.6	69.1
Gas.....	312	207	94	10,443	5,965	2,300	0.6	0.4	0.2
Water wheels.....	2,681	2,682	3,046	435,482	379,069	374,188	20.7	23.3	28.5
Water motors.....	19	13	(¹)	1,322	44	(¹)	0.1	(²)	.....
Other.....				7,563	1,683	1,656	0.4	0.1	0.1
Rented.....	7,457	1,666	(¹)	176,465	55,225	26,364	8.4	3.4	2.0
Electric.....	7,457	1,666	(¹)	154,376	27,622	6,606	7.4	1.7	0.5
Other.....				22,089	27,603	19,758	1.1	1.7	1.5
Electric motors.....	21,074	5,520	753	416,054	134,828	33,209	100.0	100.0	100.0
Run by current generated by establishment.....	13,617	3,854	753	261,678	107,206	26,603	62.9	79.5	80.1
Run by rented power.....	7,457	1,666	(¹)	154,376	27,622	6,606	37.1	20.5	19.9

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power used in the eight industries combined increased from 1,310,834 horsepower in 1899 to 2,099,050 horsepower in 1909, or 60.1 per cent. At each of the three censuses steam power constituted considerably more than two-thirds of the total primary power, the proportion being somewhat greater in 1904 than in either 1899 or 1909. Water power, which in 1899 formed 28.5 per cent of the total primary power formed but 20.8 per cent in 1909. There was a marked

increase, on the other hand, in the relative importance of the power of electric motors operated by purchased current (rented electric power). The amount of such power increased from 6,606 horsepower, or less than 1 per cent of the total primary power, in 1899, to 154,376 horsepower, or 7.4 per cent of the total, in 1909. The number and horsepower of electric motors used for distributing power by means of current generated in the establishment also shows a rapid increase.

SPECIAL STATISTICS RELATING TO MATERIALS AND EQUIPMENT.

Raw fibers used.—Table 9 gives the quantities of the several raw fibers used as materials in the eight textile industries in 1909 and 1899. Mills which con-

fine their consumption of raw material to some one fiber often buy yarns of other fibers for weaving; such consumption is not, however, covered by Table 9.

Table 9

INDUSTRY.	COMBINED TEXTILES—RAW FIBERS CONSUMED (POUNDS).											
	Cotton.		Wool.		Animal hair and fur. ¹		Silk.		Flax.		Hemp, jute, etc.	
	1909	1899	1909	1899	1909	1899	1909	1899	1909	1899	1909	1899
Total.....	2,485,225,672	1,923,704,600	558,850,896	412,745,779	41,549,822	35,737,924	17,729,306	9,760,770	28,063,703	16,980,646	632,738,278	507,777,585
Cotton goods, including cotton small wares.....	2,335,344,906	1,817,643,390	41,400	.....	.....	.....	.....	.....	.....	.....	22,087	.....
Cotton goods.....	2,332,262,636	1,814,002,512	41,400	.....	.....	.....	.....	.....	.....	.....	22,087	.....
Cotton small wares.....	3,082,270	3,640,878	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Woolen, worsted, and felt goods and wool hats.....	21,399,731	41,470,560	488,368,690	342,498,189	33,447,534	28,490,048	.....	.....	.....	.....	.....	.....
Woolen goods.....	15,801,394	34,967,959	87,037,951	150,200,616	17,719,863	21,084,607	.....	.....	.....	.....	.....	.....
Worsted goods.....	4,222,667	5,276,751	387,717,415	179,977,936	7,441,659	4,504,438	.....	.....	.....	.....	.....	.....
Felt goods.....	1,375,670	1,225,850	12,409,826	9,606,263	8,144,011	2,819,521	.....	.....	.....	.....	.....	.....
Wool hats.....	.....	.....	1,203,498	2,713,374	142,001	121,482	.....	.....	.....	.....	.....	.....
Hosiery and knit goods.....	75,416,023	49,451,301	7,068,788	17,953,907	181,344	962,119	.....	.....	.....	.....	.....	.....
Carpets and rugs, other than rag-shoddy.....	5,147,130	1,943,942	64,135,020	51,871,334	5,400,944	6,189,757	.....	.....	.....	.....	.....	.....
Shoddy.....	293,292	172,652	237,097	422,349	2,510,000	106,000	.....	.....	.....	.....	.....	.....
Silk and silk goods, including throwsters.....	.....	.....	.....	.....	.....	.....	17,472,204	9,760,770	.....	.....	.....	.....
Cordage and twine and jute and linen goods.....	27,624,490	13,022,755	.....	.....	.....	.....	.....	.....	28,954,785	16,980,646	632,764,191	507,777,585

¹ Includes 7,938,735 pounds of camel, alpaca, vicuna, and mohair in 1909 and 6,217,641 pounds in 1899.

Cotton is the fiber most generally used as a material, and in 1909 the purchase of raw cotton was reported by all of the seven branches of the combined textile industry using raw fiber except the silk industry. In 1909 cotton formed 65.8 per cent of the entire amount of raw fiber used, as compared with 66.2 per cent in 1899. The increase between 1899 and 1909 in the amount of cotton used in the textile industries was 541,520,972 pounds, or 28.1 per cent. In the cotton goods industry (including the manufacture of cotton small wares), which in 1909 consumed 94.7 per cent of the cotton used in the combined textile industries, there was an increase of 517,701,516 pounds, or 28.5 per cent. There was an increase of 25,964,722 pounds, or 52.5 per cent, during the decade, in the amount of cotton used in the hosiery and knit goods industry, while in the manufacture of carpets and rugs there was an increase of 3,203,188 pounds, or 164.8 per cent. In the other branches of the woolen industry, on the other hand, there was a material decrease in the use of cotton between 1899 and 1909.

Hemp, jute, and similar fibers, other than flax, ranked next to cotton in quantity used (though not in value), but the consumption reported is confined almost exclusively to the industry designated "cordage and twine and jute and linen goods." Aside from fibers of this character, wool is next in importance as a material in the textile industries, comprising in 1909 14.9 per cent of the entire quantity of fiber reported. There was an increase in the consumption of wool from 1899 to 1909 of 147,105,216 pounds, or 35.6 per cent. The increase was practically confined to the carpet and rug and to the worsted and the felt goods branches of the woolen industry. In the carpet and rug industry the increase was 12,263,686 pounds, or 23.6 per cent; in the worsted goods branch of the woolen industry the increase was 207,739,479 pounds,

or 115.4 per cent; and in the felt goods branch the increase was 2,803,563 pounds, or 29.2 per cent. In the period from 1899 to 1909 there was a decrease in the quantity of wool used in the hosiery and knit goods and the shoddy industries, and in the woolen goods and wool hat branches of the woolen industry. The greatest decrease is shown for the woolen goods branch of the woolen industry, which used 150,200,616 pounds of wool in 1899 and only 87,037,951 pounds in 1909—a reduction of 42.1 per cent. This does not indicate a falling off to that extent in the manufacturing capacity of the industry, but that owing to the demands of fashion, establishments which formerly engaged in the manufacture of woolen goods turned their attention to worsteds. In the hosiery and knit goods industry the decrease was 10,885,119 pounds, or 60.6 per cent.

The consumption of animal hair and fur by the combined industries was somewhat greater in 1909 than in 1899. There was a notable increase in the consumption of such material in the manufacture of shoddy, the quantity reported for 1909 being almost 24 times as great as that used in 1899.

The use of raw silk is practically confined to the silk industry, although in 1909 a small amount was used in the cotton goods industry. The increase between 1899 and 1909 in the quantity of raw silk used was 7,968,536 pounds, or 81.6 per cent. Some of the other textile industries, however, used considerable quantities of silk yarn. (See Table 10.)

Yarns purchased.—Table 10 shows, for 1909 and 1899, the quantity of purchased yarns used in the seven textile industries which use yarns, and in the branches of the cotton goods and woolen industries. The large quantities of yarns made in the same establishments which used them as material in further manufacture are not included.

Table 10

COMBINED TEXTILES—YARN PURCHASED (POUNDS).

INDUSTRY.	Cotton.		Woolen, worsted, and merino.		Silk.		Linen.		Jute, ramie, and other vegetable fiber.		Other kinds.	
	1909	1899	1909	1899	1909	1899	1909	1899	1909	1899	1909	1899
	Total	430,483,305	293,388,075	122,714,085	89,383,287	9,929,573	5,047,955	10,852,249	10,943,297	58,817,959	41,240,020	2,080,260	1,222,943
Cotton goods, including cotton small wares.....	128,707,003	94,692,864	1,613,118	1,531,103	2,062,006	560,680	669,532	1,575,403	406,705	220,507	854,161	1,009,745
Cotton goods.....	108,360,478	83,832,216	1,251,282	1,209,444	1,923,727	507,119	665,532	1,575,403	350,755	220,507	795,934	291,301
Cotton small wares.....	18,346,525	10,860,648	361,836	321,659	138,279	53,561	4,000	.....	55,950	.....	58,227	718,444
Woolen, worsted, and felt goods and wool hats.....	39,432,613	35,394,433	62,167,817	34,732,876	282,536	131,929	14,453	27,064	1,148,389	1,118,767	.....	.....
Woolen goods.....	18,888,501	21,922,136	8,035,598	12,489,092	1,923,727	70,959	67,964	12,685	1,031,880	1,118,767	.....	.....
Worsteds.....	22,280,887	13,420,590	54,016,104	22,163,388	211,577	73,951	.....	1,314	2,170	.....	.....	.....
Felt goods.....	263,225	51,707	116,115	80,396	.....	14	.....	1,768	17,905	.....	.....	.....
Wool hats.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hosiery and knit goods.....	218,987,611	131,820,068	20,524,878	10,426,592	982,753	266,247	1,241,754	71,478	.....	44,682	.....	.....
Carpets and rugs, other than rag.....	26,166,241	19,823,561	37,595,684	42,452,553	196,840	188,414	8,792,876	8,388,211	55,592,343	38,846,413	.....	.....
Shoddy.....	.....	.....	202,000	.....	.....	.....	.....	.....	70,000	.....	.....	.....
Silk and silk goods, including throwsters.....	* 14,111,878	* 6,664,069	610,588	239,461	6,405,438	3,894,811	(¹)	.....	.....	.....	1,063,888	213,198
Cordage and twine and jute and linen goods.....	7,077,959	4,973,080	.....	682	.....	5,874	933,634	* 881,141	1,600,522	1,009,651	142,211	.....

¹ Includes jute and other vegetable fiber yarns.
² Includes 1,494,586 pounds of mercerized cotton yarn.
³ Includes 219,861 pounds of mercerized cotton yarn.

⁴ Included with "other kinds"
⁵ Includes hemp yarn.

An increased quantity of each kind of yarn was purchased in 1909 as compared with 1899 except in the case of linen yarn, for which a slight decrease is shown. Of the different kinds of yarns purchased silk yarn shows the largest percentage of increase in consumption (96.7 per cent), and cotton yarn the next largest (46.7 per cent). The amount of linen yarns purchased decreased 2.7 per cent, while that of jute, ramie, and other vegetable fiber yarns increased 42.6 per cent, and that of woolen, worsted, and merino yarns 37.3 per cent.

Purchased cotton yarn was used in each of the seven branches of the combined textile industry covered by the table except the wool hat and shoddy industries, and, except in the woolen mills, larger quantities were used in 1909 than 1899. Purchased woolen, worsted, and merino yarns were used in 1909 in every industry covered by the table except the manufacture of cordage and twine and jute and linen goods and wool hats. The amount of purchased silk yarn used shows relatively large increases in practically every branch of the combined textile industry.

More than four-fifths (82.5 per cent) of the purchased linen yarns and nearly 95 per cent of the purchased jute yarns in 1909 were used in the carpet and rug industry, the quantities used being greater that year than in 1899.

Total production and consumption of cotton and woolen yarns.—The returns for 1909 permit of a tabulation of the total production and the total consumption of cotton, woolen and worsted, and merino yarns in the textile industries, as each establishment reported the quantities of these yarns made for its own consumption, the quantities made for sale, and the quantities of purchased yarns used. Table 11 presents statistics on this subject for the several industries.

Of the total production of cotton yarn in the textile industries in 1909, 1,647,131,776 pounds, or 77.4 per cent, was made for consumption in the establishment producing and 482,046,102 pounds, or 22.6 per cent, for sale. The total consumption in the seven industries covered by Table 11 includes 430,483,305 pounds purchased in addition to that made for consumption in the mills producing. The excess of the total production over the total consumption in these industries was 51,562,797 pounds, which is equal to 2.4 per cent of the production; this represents approximately the quantity of cotton yarn used in other industries and in the hand trades, that exported, and in stocks on hand

at close of the year. In like manner the excess of the production shown over the consumption of woolen and worsted yarns in the specified industries was 2,894,107 pounds, or eight-tenths of 1 per cent of the total production; and in the case of merino yarns, 7,305,393 pounds, or 10.9 per cent of the total production.

Table 11

INDUSTRY.	Cotton yarns (pounds).	Woolen and worsted yarns (pounds).	Merino yarns (pounds).
Production	2,129,177,878	853,834,571	66,855,578
Cotton goods, including cotton small wares.....	2,040,290,743		
Woolen, worsted, and felt goods, and wool hats.....	7,343,235	292,447,515	45,330,262
Carpets and rugs, other than rag.....	4,183,091	52,847,303	
Hosiery and knit goods.....	76,628,689	8,539,753	21,345,311
Cordage and twine and jute and linen goods.....	732,120		
Shoddy.....			180,000
Consumption	2,077,815,081	350,940,464	59,550,180
Cotton goods, including cotton small wares.....	1,096,626,751	1,307,448	305,670
Woolen, worsted, and felt goods, and wool hats.....	44,450,262	235,683,062	33,406,724
Carpets and rugs, other than rag.....	29,189,343	88,289,344	584,188
Hosiery and knit goods.....	280,158,888	25,050,022	24,871,598
Cordage and twine and jute and linen goods.....	7,077,959		
Silk and silk goods.....	14,111,878	610,588	
Shoddy.....			382,000

Production, imports, exports, and consumption of raw fibers.—Table 12 shows, for the United States as a whole, the production, imports, exports, and consumption of the leading raw fibers for 1909, 1899, and 1889, together with the total value and average value per pound of the imports and exports, respectively.

The aggregate quantity of textile fibers produced in the United States in 1909, as shown in the table, was 5,497,285,000 pounds, as compared with 4,055,298,000 pounds in 1889, the increase for the 20-year period being 1,441,987,000 pounds, or 36 per cent. During the same period the imports of textile fibers increased from 557,688,000 pounds to 1,054,545,000 pounds, or 89 per cent, the exports from 2,489,050,000 pounds to 3,241,824,000 pounds, or 30 per cent, and the consumption in the United States from 2,021,224,000 pounds to 3,740,369,000 pounds, or 85 per cent.

The United States used more than one-fifth of the world's production of raw silk in 1909, ranking next to China in the consumption of this product. The increasing importance of manila hemp and sisal in the manufacture of cordage and twine is noteworthy. By far the greater portion of the jute imported is used in the manufacture of gunny bagging or burlap, large quantities of which are used for covering cotton bales, for grain sacks, and for various other purposes.

PRODUCTION, IMPORTS, EXPORTS, AND CONSUMPTION OF THE LEADING RAW TEXTILE FIBERS:
1909, 1899, AND 1889.

[The statistics for production were collected by the Bureau of the Census, except for flax for 1909, and for wool. Those for imports and exports were obtained from the reports of the Bureau of Foreign and Domestic Commerce, Department of Commerce. For some of the other figures, nonofficial sources have been consulted, and for these only an approximation to the facts is claimed. The statistics for production are for the growth year, those for imports and exports for the fiscal year beginning July 1, and those for consumption for the census year.]

FIBER.	Year.	Production (pounds).	IMPORTS.			EXPORTS (INCLUDING REEXPORTS).			Consumption (pounds).
			Quantity (pounds).	Value.	Average value per pound.	Quantity (pounds).	Value.	Average value per pound.	
Cotton.....	1909	5,157,691,000	86,038,000	\$15,816,000	\$0.184	3,212,240,000	\$451,746,000	\$0.141	2,465,226,000
	1899	4,729,968,000	67,399,000	7,961,000	0.118	3,127,607,000	243,158,000	0.078	1,923,705,000
	1889	3,736,256,000	8,606,000	1,393,000	0.162	2,472,048,000	251,008,000	0.102	1,193,399,000
Wool ¹	1909	328,111,000	263,928,000	51,221,000	0.194	4,055,000	869,000	0.214	559,851,000
	1899	272,191,000	155,928,000	20,261,000	0.130	7,903,000	1,219,000	0.154	412,746,000
	1889	295,779,000	105,431,000	15,264,000	0.145	3,520,000	590,000	0.188	374,103,000
Silk, including cocoons.....	1909	.....	20,412,000	65,439,000	3.206	93,000	336,000	3.602	17,729,000
	1899	.....	11,289,000	44,568,000	3.956	119,000	453,000	3.799	9,761,000
	1889	.....	6,106,000	23,374,000	3.828	19,000	78,000	4.101	6,377,000
Flax.....	1909	4,000,000	28,585,000	3,536,000	0.124	121,000	13,000	0.108	28,064,000
	1899	840,000	15,606,000	1,646,000	0.105	11,000	85	0.009	16,981,000
	1889	241,000	18,028,000	2,188,000	0.121	.....	.....	.....	18,269,000
Hemp.....	1909	7,483,000	14,388,000	1,040,000	0.072	925,000	59,000	0.063	19,724,000
	1899	7,616,000	450,000	450,000	0.059	336,000	17,000	0.051	25,589,000
	1889	23,022,000	81,964,000	7,342,000	0.090	556,000	54,000	0.098	104,430,000
Jute.....	1909	.....	152,667,000	3,728,000	0.024	376,000	30,000	0.034	260,379,000
	1899	.....	230,032,000	3,956,000	0.017	60,000	1,000	0.016	206,250,000
	1889	.....	202,494,000	3,250,000	0.016	939,000	11,000	0.011	201,555,000
Manila hemp.....	1909	.....	208,887,000	10,517,000	0.050	19,542,000	1,345,000	0.069	131,612,000
	1899	.....	95,478,000	7,172,000	0.075	2,287,000	246,000	0.108	123,242,000
	1889	.....	(^e)	(^e)	.....	(^e)	(^e)	.....	(^e)
Sisal.....	1909	.....	223,924,000	11,441,000	0.050	2,191,000	128,000	0.058	203,849,000
	1899	.....	172,303,000	11,782,000	0.068	3,120,000	206,000	0.066	146,353,000
	1889	.....	(^e)	(^e)	.....	(^e)	(^e)	.....	(^e)
Other vegetable fibers.....	1909	.....	55,716,000	2,157,000	0.039	1,781,000	89,000	0.050	53,935,000
	1899	.....	37,410,000	1,366,000	0.034	4,151,000	202,000	0.049	33,259,000
	1889	.....	7,135,059,000	7,762,000	0.057	7,11,968,000	7,737,000	0.062	123,091,000

¹ The statistics of production are as estimated by the National Association of Wool Manufacturers and include pulled wool, while those of imports and exports include hair of the alpaca, goat, and other like animals.

² Computed from other figures shown.

³ Includes manila.

⁴ Arrived at by subtraction. Manila hemp is included.

⁵ Included under "Hemp."

⁶ Included under "Other vegetable fibers."

⁷ Includes sisal.

⁸ Arrived at by subtraction. Sisal is included.

Table 13 gives the world's production of the leading textile fibers, by countries, for 1909, 1899, and 1889. It may be noted that although a considerable amount of flax is raised in the United States, most of it is grown for the seed alone, and only rough estimates are available for the small production of flax fiber utilized as a textile material.

In 1909 the United States produced 31 per cent of the total reported production of the leading textile fibers, 49 per cent of the two most important fibers, cotton and wool, combined, and 61 per cent of cotton alone. The cotton crop of the United States in 1909 was below the normal; the country, however, supplied about two-thirds of the world's production in 1907 and 1908, and more than seven-tenths in 1911.

The relative importance of the textile fibers named in the table has undergone considerable change since the beginning of the nineteenth century. Flax, which

was used to a larger extent than any other fiber in 1800, now ranks fourth, and the quantity of flax produced is only about three times as large as at the beginning of the last century. The production of wool, on the other hand, has increased from about 500,000,000 pounds in 1800 to nearly 2,800,000,000 pounds, or more than five times as much, in 1909, and the production of cotton from about 300,000,000 pounds to 8,505,000,000 pounds, or more than twenty-eight times as much. The most remarkable increase, however, has been in the production of jute, the quantity of this fiber produced in 1850 being about 60,000,000 pounds, as compared with 2,918,000,000 pounds in 1909.

The increase in the world's production of textile fibers between 1889 and 1909 were as follows: Cotton, 45 per cent; wool, 13 per cent; silk, 112 per cent; flax, 86 per cent; and jute, 57 per cent. Hemp shows a decrease of 1 per cent.

WORLD'S PRODUCTION OF THE LEADING TEXTILE FIBERS: 1909, 1899, AND 1889.

[The statistics for the United States were collected by the Bureau of the Census, except those for flax for 1909, and for wool. These statistics, as well as the statistics for foreign countries, have been compiled from a number of sources. Among them are reports of the National Association of Wool Manufacturers, Boston, of the Flax Supply Association, Belfast, of Russian Departments of Commerce and Agriculture, St. Petersburg, and of the Silk Association of America, New York, and data furnished by the International Flax Twine Co., Chicago, by the Columbia Rope Co., Auburn, N. Y., and by Ralli Bros., New York. Since it has not been practicable to secure satisfactory data in all instances, only an approximation to the facts is claimed for the statistics not collected by special inquiries.]

Table 13 COUNTRY.	Year.	PRODUCTION (POUNDS).					
		Cotton.	Wool.	Silk. ¹	Flax.	Hemp.	Jute.
Total	1909	8,605,191,000	2,763,421,000	85,048,000	1,872,127,000	1,450,669,000	2,918,000,000
	1899	7,034,968,000	² 2,668,391,000	60,812,000	1,142,482,000	1,625,875,000	2,200,000,000
	1889	6,873,856,000	³ 2,445,479,000	40,066,000	1,007,224,000	1,470,270,000	1,860,000,000
United States	1909	5,157,691,000	328,111,000	-----	4,000,000	7,483,000	-----
	1899	4,729,968,000	272,191,000	-----	840,000	11,751,000	-----
	1889	3,736,256,000	295,779,000	-----	241,000	23,022,000	-----
Brazil	1909	180,000,000	1,130,000	-----	-----	-----	-----
	1899	150,000,000	1,500,000	-----	-----	-----	-----
	1889	120,000,000	1,875,000	-----	-----	-----	-----
Argentina	1909	-----	392,419,000	-----	-----	-----	-----
	1899	-----	370,000,000	-----	-----	-----	-----
	1889	-----	376,700,000	-----	-----	-----	-----
United Kingdom	1909	-----	133,705,000	-----	⁴ 26,934,000	-----	-----
	1899	-----	140,200,000	-----	16,034,000	-----	-----
	1889	-----	147,500,000	-----	⁴ 22,139,000	-----	-----
Russia	1909	360,000,000	380,000,000	(⁵)	1,594,000,000	1,021,223,000	-----
	1899	300,000,000	361,100,000	(⁵)	876,788,000	1,100,000,000	-----
	1889	166,000,000	291,500,000	(⁵)	705,011,000	1,000,000,000	-----
France	1909	-----	78,000,000	1,486,000	⁴ 46,340,000	30,875,000	-----
	1899	-----	103,600,000	1,235,000	27,839,000	47,169,000	-----
	1889	-----	124,800,000	1,363,000	63,086,000	86,922,000	-----
Italy	1909	-----	21,500,000	9,373,000	⁶ 44,800,000	150,000,000	-----
	1899	-----	21,400,000	7,415,000	⁷ 44,741,000	166,843,000	-----
	1889	-----	21,400,000	6,350,000	31,736,000	186,458,000	-----
Austria-Hungary	1909	-----	41,600,000	838,000	⁴ 104,332,000	144,513,000	-----
	1899	-----	64,300,000	605,000	112,809,000	145,681,000	-----
	1889	-----	54,300,000	589,000	99,536,000	143,868,000	-----
Turkey	1909	16,000,000	135,500,000	(⁵)	-----	-----	-----
	1899	25,000,000	100,500,000	(⁵)	-----	-----	-----
	1889	8,000,000	50,000,000	(⁵)	-----	-----	-----
British Indies	1909	1,801,000,000	50,000,000	⁸ 518,000	-----	73,764,000	2,918,000,000
	1899	837,500,000	85,000,000	⁸ 772,000	-----	27,755,000	2,200,000,000
	1889	1,200,000,000	72,000,000	⁸ 463,000	-----	15,000,000	1,860,000,000
Japan	1909	(⁵)	-----	30,135,000	-----	18,963,000	-----
	1899	(⁵)	-----	12,388,000	-----	24,161,000	-----
	1889	(⁵)	-----	7,828,000	-----	(⁵)	-----
China	1909	300,000,000	42,253,000	35,697,000	-----	-----	-----
	1899	200,000,000	35,000,000	34,344,000	-----	-----	-----
	1889	200,000,000	(⁵)	21,771,000	-----	-----	-----
Egypt	1909	455,500,000	3,000,000	-----	-----	-----	-----
	1899	647,500,000	3,000,000	-----	-----	-----	-----
	1889	291,000,000	2,800,000	-----	-----	-----	-----
Australia and New Zealand	1909	-----	756,590,000	-----	-----	-----	-----
	1899	-----	510,000,000	-----	-----	-----	-----
	1889	-----	550,000,000	-----	-----	-----	-----
All other countries	1909	235,000,000	399,613,000	7,001,000	⁴ 51,721,000	3,748,000	-----
	1899	145,000,000	600,600,000	4,053,000	63,431,000	2,615,000	-----
	1889	152,600,000	456,825,000	1,702,000	75,475,000	15,000,000	-----

¹ Does not include Tussah silk.² Except for the United States and the United Kingdom, the figures are for 1900.³ Except for the United States, the figures relate to 1891.⁴ The figures relate to 1908.⁵ Included in "all other countries."⁶ The figures relate to 1902.⁷ The figures relate to 1895.⁸ Exports, instead of production.

The total estimated production for 1909 of the leading textile fibers, as shown in the table, was 17,594,356,000 pounds, of which cotton constituted 48 per cent; wool, 16 per cent; silk, about one-half of 1 per cent; flax, 11 per cent; hemp, 8 per cent; and jute, 17 per cent. During the 20 years covered by the table the proportion which cotton constituted of all fibers increased from 46 to 48 per cent, that for flax from 8 to 11 per cent, and that for jute from 15 to 17 per cent; silk also showed a slight increase in the proportion which it represented of the total, while the proportions represented by wool and hemp decreased. The total supply of these textile fibers in commercial channels

at the beginning of the nineteenth century amounted to approximately 1,400,000,000 pounds, of which cotton formed about 22 per cent; wool, 33 per cent; silk, 2 per cent; and flax, 43 per cent.

Producing spindles.—Table 14 gives the number of producing spindles in active textile mills at the time of each census from 1869 to 1909, inclusive. It does not include spindles in establishments engaged primarily in the manufacture of products other than textiles, nor spindles employed on flax, hemp, jute, and allied fibers, of which latter class 142,169 were returned in 1909; nor does it include doubling and twisting spindles which do not use raw fiber.

CENSUS YEAR.	NUMBER OF PRODUCING SPINDLES.				
	Total.	Cotton spindles.	Silk spindles.	Woolen spindles.	Worsted spindles.
1909.....	33,866,479	28,178,862	1,777,962	2,156,849	1,752,806
1904.....	28,721,742	23,672,064	1,394,020	2,456,389	1,199,269
1899.....	23,901,557	19,463,984	1,213,493	2,229,181	994,899
1889.....	¹ 18,092,133	14,384,180	718,360	2,332,269	657,324
1879.....	¹ 13,170,743	10,653,435	262,312	1,915,070	339,826
1869.....	¹ 9,338,953	7,280,800	12,040	1,845,496	200,617

¹ Includes some accessory spindles, except for silk.

The percentage of increase from 1899 to 1909 in the total number of spindles was greater than that for any other decade shown. In 1909 cotton spindles formed 83.2 per cent of the total number, silk spindles, 5.2 per cent, and woolen and worsted spindles combined, 11.5 per cent. In 1909 cotton spindles represented a slightly larger proportion of all spindles than in 1904 and 1899, and woolen and worsted spindles combined a slightly smaller proportion.

Looms.—The number of power and of hand looms, respectively, used in the manufacture of the several kinds of textiles, as reported for each census year from 1869 to 1909, is shown in Table 15. It does not include looms in establishments engaged primarily in the manufacture of products other than textiles, nor looms employed on flax, hemp, jute, and similar fibers.

The increase in the total number of power looms from 1899 to 1909 was 252,264, or 44 per cent. There was an increase from 1899 to 1909 in the number of each kind of power looms shown in the table except

the woolen looms, which decreased in number, though the combined number of woolen and worsted looms increased. The largest relative increase from 1904 to 1909 was in the worsted looms (power looms only), 40.4 per cent; the number employed on silk goods increased 26.1 per cent and the number on cotton goods 18.9 per cent. Cotton looms operated by power formed 80.6 per cent of the total number of looms in 1909 as compared with 79.5 per cent in 1899; silk power looms, 9.1 per cent as compared with 7.7 per cent; woolen power looms, 4 per cent as compared with 6.4 per cent; and worsted power looms, 4.8 per cent as compared with 4.6 per cent. The use of hand looms has been decreasing very rapidly since 1879 and their number in 1909 was insignificant.

CLASS OF LOOMS AND CENSUS YEAR.	NUMBER OF LOOMS.					
	Total.	Cotton looms.	Silk looms.	Woolen looms.	Worsted looms.	Carpet and rug looms.
Power:						
1909.....	826,418	665,652	75,406	33,148	39,476	11,736
1904.....	696,785	559,781	59,775	38,104	28,123	11,002
1899.....	573,214	455,752	44,257	36,734	26,630	9,841
1889.....	412,441	324,866	20,822	38,523	19,929	8,301
1879.....	285,494	227,393	5,321	32,955	11,703	8,132
1869.....	200,791	157,748	1,281	34,183	6,128	1,451
Hand:						
1909.....	248	(¹)	(²)		41	207
1904.....	1,039	(¹)	283		66	690
1899.....	1,311	(¹)	173		83	1,055
1889.....	4,823	(¹)	1,747		448	2,628
1879.....	7,929	(¹)	3,153		781	3,995
1869.....	4,163	(¹)	188		(¹)	3,975

¹ Not reported.

² Included with power looms.

COTTON MANUFACTURES

COTTON MANUFACTURES.

GENERAL STATISTICS FOR THE INDUSTRY AS A WHOLE.

Scope of the industry.—Under the census classification "cotton goods, including cotton small wares," two classes of mills are distinguished: (1) those producing "cotton goods," including mills engaged in the spinning of cotton or in the weaving of piece goods, or in both of these processes; and (2) those producing "cotton small wares," including establishments manufacturing narrow fabrics, such as tapes, webbing and mill banding, braids, shoe and corset laces, and similar goods. All establishments producing piece goods are included in the former group, even though manufacturing some narrow woven goods or braids; and the latter group includes some establishments that do spinning, but only in cases where the yarns are used by the establishment in the manufacture of cotton small wares.

Summary for the industry: 1909.—Table 1 presents a summary of the statistics of the cotton goods industry as a whole for 1909.

	Total for the industry.	ESTABLISHMENTS ENGAGED PRIMARILY IN MANUFACTURING—	
		Cotton goods.	Cotton small wares.
Number of establishments.....	1,324	1,208	116
Persons engaged in the industry.....	387,771	379,538	8,233
Proprietors and firm members.....	377	303	74
Salaried employees.....	8,514	8,053	461
Wage earners (average number).....	378,880	371,182	7,698
Primary horsepower.....	1,296,517	1,286,105	10,412
Capital.....	\$822,237,529	\$806,412,757	\$13,824,772
Expenses.....	554,221,688	542,453,004	11,768,684
Services.....	147,270,903	143,504,935	3,765,968
Salaries.....	14,411,758	13,715,218	696,540
Wages.....	132,859,145	129,789,717	3,069,428
Materials.....	371,009,470	364,013,504	6,995,966
Miscellaneous.....	35,941,315	34,934,565	1,006,750
Value of products.....	628,391,813	615,217,702	13,174,111
Value added by manufacture (value of products less cost of materials).....	257,382,343	251,204,198	6,178,145

Of the two branches of the industry the cotton goods branch is by far the more important, comprising 91.2

per cent of the total number of establishments in the industry in 1909, and contributing 97.9 per cent of the total value of products.

Comparison with earlier censuses.—The first census at which statistics were obtained for the cotton goods industry was that of 1839. At that census 1,240 establishments were reported, giving employment to 72,119 persons, with products valued at \$46,350,453; for 1849, 1,094 establishments were reported, giving employment to 92,286 hands, and manufacturing products valued at \$61,869,184; and in 1859 there were 1,091 establishments, employing 122,028 hands, and with a value of products amounting to \$115,681,774.

Table 2 summarizes the statistics of the industry (the manufacture of cotton goods and of cotton small wares combined) for each census from 1869 to 1909, inclusive. Prior to the census of 1899 no distinction was made between plants manufacturing cotton goods and those manufacturing cotton small wares, but at that census and also at the censuses of 1909 and 1904 they were reported separately. In this and all following tables, however, the statistics for the two classes of establishments are combined, except as especially noted.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

The figures for 1879 do not include those for 249 mills, employing 12,928 hands, classed as "special mills," which were engaged in the manufacture of hosiery, webbing, tapes, and fancy fabrics, and mixed goods or other fabrics not sold as specific manufactures of wool or cotton. The cotton used in these mills cost \$2,338,385, and the value of their products was \$18,860,273.

	COTTON GOODS, INCLUDING COTTON SMALL WARES.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	1,324	1,154	1,055	905	756	956	25.5	14.7	9.4	16.6	19.7	-20.9
Persons engaged in the industry.....	387,771	323,287	308,237	(2)	(3)	(2)	25.8	19.9	4.9	.....	.....	.....
Proprietors and firm members.....	377	432	474	(2)	(3)	(2)	-20.5	-12.7	-8.9	.....	.....	.....
Salaried employees.....	8,514	8,981	4,902	(2)	(3)	(2)	73.7	22.0	42.4	.....	.....	.....
Wage earners (average number).....	378,880	315,874	302,861	218,876	172,544	135,369	25.1	19.9	4.3	(2)	(3)	(3)
Primary horsepower.....	1,296,517	986,604	795,834	464,881	275,504	146,040	62.9	31.4	24.0	71.2	68.7	88.6
Capital.....	\$822,237,529	\$613,110,655	\$467,240,157	\$354,020,843	\$208,280,346	\$140,706,291	76.0	34.1	31.2	32.0	70.0	48.0
Expenses.....	554,221,688	423,186,368	282,704,156	241,118,775	(2)	(2)	89.3	31.0	44.6	21.4	.....	.....
Services.....	147,270,903	106,443,687	94,039,951	69,489,272	42,040,510	39,044,132	58.6	38.4	13.2	35.3	65.3	7.7
Salaries.....	14,411,758	10,237,891	7,350,199	(2)	(2)	(2)	98.1	40.8	39.3	.....	.....	.....
Wages.....	132,859,145	96,205,796	86,689,752	(2)	(2)	(2)	53.3	38.1	11.0	.....	.....	.....
Materials.....	371,009,470	286,285,303	176,551,527	154,912,979	102,206,347	111,736,936	110.1	29.6	62.1	14.0	51.6	-8.5
Miscellaneous.....	35,941,315	30,487,378	22,112,678	16,716,524	(2)	(2)	62.5	17.9	37.9	32.3	.....	.....
Value of products.....	628,391,813	450,467,704	339,200,320	267,981,724	192,090,110	177,489,739	85.3	39.5	32.8	26.6	39.5	8.2
Value added by manufacture (value of products less cost of materials).....	257,382,343	164,212,401	162,648,793	113,068,745	89,883,763	65,752,803	58.2	56.7	1.0	43.8	25.8	36.7

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The cotton goods industry is one of the oldest and most typical factory industries in the United States. In 1909 it ranked third among the industries of the country in number of wage earners, being exceeded only by the lumber industry and the foundry and machine-shop industry, and seventh in value of products and in value added by manufacture.

The value of products reported for 1909, which, however, involves considerable duplication, was \$628,391,813. The total cost of materials was \$371,009,470, which was nearly three-fifths (59 per cent) of the total value of products, while the value added by manufacture (that is, the value of products less the cost of materials) was \$257,382,343.

The industry gave employment to an average of 387,771 persons, of whom 378,880 were wage earners. The amount paid in salaries and wages was \$147,270,903, which is equal to considerably more than half of the value added by manufacture.

The industry has had a steady growth throughout the 70 years for which statistics are available, the

value of products in 1909 being more than thirteen times as great as in 1839, and the number of wage earners more than five times as great, while the number of establishments shows an increase of 84, or 6.8 per cent. For most of the items covered by the table the percentages of increase for the decade 1899-1909 were higher than those for any other decade. The advance in the prices of commodities during the past decade, however, doubtless accounts in part for some of these increases.

Summary, by states.—Table 3 summarizes the more important statistics of the industry by states, the states being arranged according to the value of products reported for 1909. In determining the rank of the states, all states are considered, regardless of whether or not they are shown in the table; hence some omissions occur in the several series of numbers indicating rank, as certain states included under "all other states" held a higher rank in some items than some of the states for which separate figures are given.

Table 3

COTTON GOODS, INCLUDING COTTON SMALL WARES.

STATE.	Number of establishments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.		
											1899	1904	1899	1909	1904	1899	1909	1904	
United States.....	1,324	378,880	100.0		\$628,391,813	100.0		\$257,382,343	100.0		25.1	19.9	4.3	85.3	39.5	32.8	58.2	58.7	1.0
Massachusetts.....	182	108,914	28.7	1	186,462,313	29.7	1	81,305,519	31.6	1	17.7	22.9	-4.2	67.8	43.4	17.0	43.3	63.3	-12.2
North Carolina.....	281	47,231	12.5	2	72,680,385	11.6	2	23,992,813	9.3	4	56.0	29.9	20.1	156.2	53.8	66.5	11.8	68.6	29.5
South Carolina.....	147	45,454	12.0	3	65,929,585	10.5	3	24,626,147	9.6	3	50.5	22.0	23.4	121.8	33.4	66.3	97.6	62.8	21.4
Rhode Island.....	106	28,786	7.6	4	60,312,597	8.0	4	24,911,358	9.7	2	19.8	16.3	3.0	90.3	45.5	30.8	69.0	67.1	1.1
Georgia.....	116	27,803	7.3	5	48,036,817	7.6	5	15,988,078	6.2	6	52.1	16.2	32.0	160.3	36.6	90.6	117.7	41.0	54.4
Pennsylvania.....	175	16,293	4.3	7	33,917,033	5.4	6	15,160,008	6.9	5	-4.2	6.7	-10.3	33.3	29.0	3.3	23.5	26.6	-2.4
New Hampshire.....	21	22,290	5.9	6	33,601,830	5.3	7	14,477,980	6.6	7	9.0	13.0	-3.5	46.1	13.7	28.4	31.2	31.1	0.1
Connecticut.....	52	14,360	3.8	9	24,231,881	3.9	8	12,272,159	4.8	8	8.8	9.5	-0.6	56.4	31.5	19.0	54.3	49.3	3.4
Alabama.....	51	12,731	3.4	10	22,211,748	3.5	9	7,838,501	3.0	11	62.8	10.9	37.8	172.4	32.5	105.6	135.6	65.1	42.7
Maine.....	16	14,634	3.9	8	21,932,225	3.5	10	10,541,746	4.1	9	6.6	18.2	-9.8	49.9	42.4	5.3	38.8	69.1	-17.9
New York.....	47	10,663	2.8	11	20,351,555	3.2	11	8,625,066	3.4	10	15.2	21.2	-6.0	88.7	51.5	24.3	70.1	80.1	-5.5
New Jersey.....	26	6,638	1.8	12	13,728,874	2.2	12	6,164,141	2.0	12	16.8			98.1			36.9		
Virginia.....	10	5,057	1.3	13	7,489,653	1.2	13	2,790,630	1.1	13	72.5	46.3	17.9	182.1	67.0	68.9	124.5	65.9	35.3
Maryland.....	16	3,966	1.0	14	5,522,293	0.9	14	1,510,552	0.6	15	-16.1	-0.7	-16.6	1.8	5.3	-3.3	-36.7	10.1	-42.4
Tennessee.....	17	3,078	0.8	15	5,200,791	0.8	15	1,857,119	0.7	14	46.0	34.2	8.8	160.7	46.1	78.5	118.0	40.7	54.9
Mississippi.....	14	2,645	0.7	16	3,102,396	0.5	16	1,060,248	0.4	16	67.9	22.4	29.0	110.6	25.9	67.2	50.1	30.2	15.3
Texas.....	13	1,590	0.4	17	2,814,581	0.4	17	1,021,285	0.4	17	61.6	60.1	0.9	134.6	77.4	32.2	82.8	79.6	1.8
Indiana.....	7	1,582	0.4	18	2,501,596	0.4	18	831,601	0.3	19	11.3	34.8	-17.4	87.4	68.6	11.2	31.2	141.9	-45.7
Illinois.....	5	1,319	0.3	19	2,111,208	0.3	19	1,009,194	0.4	18	21			153.2			244.4		
Kentucky.....	4	1,044	0.3	20	1,902,467	0.3	20	714,532	0.3	20	-22.7			1.3	-23.7	14.3	21.5	-6.0	3.2
Ohio.....	4	177	(*)	24	395,175	0.1	25	161,543	0.1	25									
All other states.....	14	2,625	0.7		3,954,806	0.6		1,522,123	0.6										

¹ Percentages are based on figures in Table 45. A minus sign (-) denotes decrease. Percentage not shown where base is less than \$100,000 for value added by manufacture, or where comparable figures can not be given without disclosing individual operations.

² Less than one-tenth of 1 per cent.

The industry is confined almost entirely to the states east of the Mississippi River. From the territory west of that river only 20 establishments were reported, these being distributed among five states, as follows: Texas, 13 establishments; Louisiana, 2; Missouri, 2; Arkansas, 2; and Kansas, 1. Among the states east of the Mississippi, on the other hand, there were only three states, namely, West Virginia, Florida, and Michigan, which were without cotton mills. Massachusetts is the most important state, ranking first both in 1909 and in 1904 in average number of wage

earners, value of products, and value added by manufacture. In the year 1909 this state employed 28.7 per cent of the total number of wage earners and contributed 29.7 per cent of the total value of products for the United States. The number of wage earners in the cotton goods industry in Massachusetts increased 17.7 per cent during the decade 1899-1909, and the value of its products 67.8 per cent. North Carolina ranked second in 1909 both in number of wage earners and in value of products, and South Carolina third, these two states having changed places since

1904. Rhode Island ranked fourth in value of products in 1909, having advanced from fifth place in 1904, and fourth in the number of wage earners employed, the same position as in 1904; in value added by manufacture, however, it ranked second in 1909, having advanced from third place in 1904. Georgia, Pennsylvania, New Hampshire, Connecticut, and Alabama, in the order named, were the states next in rank in value of products in 1909.

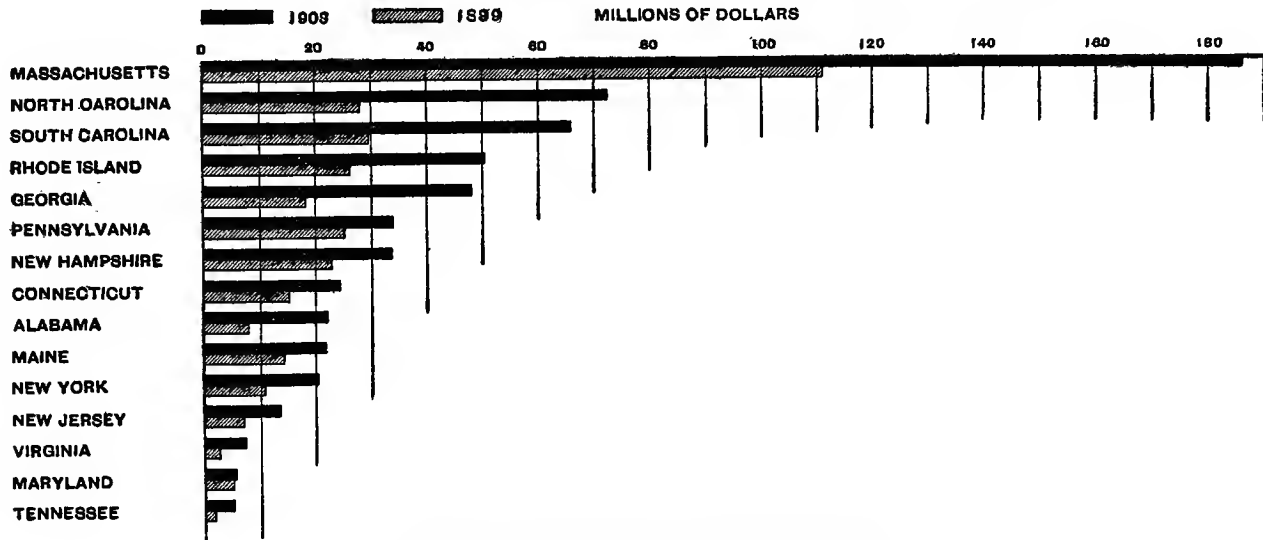
Eight of the states listed in Table 3 show an increase of over 100 per cent for the period 1899-1909 in value of products, and seven of the eight show a gain of over 50 per cent in number of wage earners. In general, the percentages of increase in the leading Southern cotton manufacturing states were decidedly greater

than those in the Northern states. Among the 10 leading states, Alabama shows the highest percentage of increase for the decade in value of products, and North Carolina the highest in number of wage earners; for the five-year period 1904-1909, however, North Carolina shows the greatest relative increase in both items.

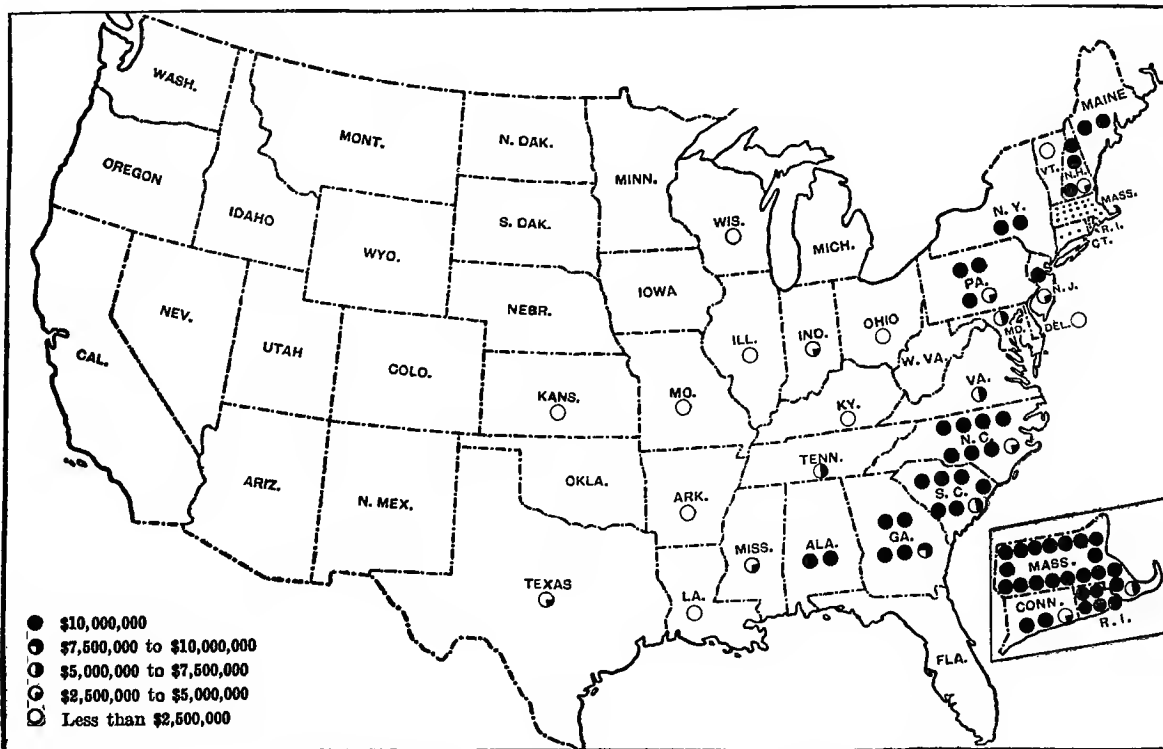
Most of the states held the same, or practically the same, rank in value added by manufacture in 1909 as in value of products.

The diagram below shows graphically the value of products reported for the most important states in the industry as a whole in 1909 and 1899, while the map shows the distribution of the value of products by states in 1909.

VALUE OF PRODUCTS FOR THE MOST IMPORTANT STATES: 1909 AND 1899.



VALUE OF PRODUCTS, BY STATES: 1909.



PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 4 shows, for 1909, the number of persons engaged in the industry as a whole and in each of its branches, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
Cotton goods, including cotton small wares.....	387,771	221,299	166,472
Proprietors and officials.....	4,461	4,410	51
Proprietors and firm members.....	377	355	22
Salaried officers of corporations.....	1,726	1,715	11
Superintendents and managers.....	2,358	2,340	18
Clerks.....	4,430	3,413	1,017
Wage earners (average number).....	378,880	213,476	165,404
16 years of age and over.....	339,574	192,930	146,644
Under 16 years of age.....	39,306	20,546	18,760
Cotton goods.....	379,538	218,205	161,333
Proprietors and officials.....	4,167	4,121	46
Proprietors and firm members.....	303	281	22
Salaried officers of corporations.....	1,613	1,605	8
Superintendents and managers.....	2,251	2,235	16
Clerks.....	4,189	3,270	919
Wage earners (average number).....	371,182	210,814	160,368
16 years of age and over.....	332,358	190,377	141,981
Under 16 years of age.....	38,824	20,437	18,387
Cotton small wares.....	8,233	3,084	5,139
Proprietors and officials.....	294	289	5
Proprietors and firm members.....	74	74	.....
Salaried officers of corporations.....	113	110	3
Superintendents and managers.....	107	105	2
Clerks.....	241	143	98
Wage earners (average number).....	7,698	2,662	5,036
16 years of age and over.....	7,216	2,553	4,663
Under 16 years of age.....	482	109	373

The average number of persons engaged in the cotton manufacturing industry as a whole during 1909 was 387,771, of whom 378,880, or 97.7 per cent, were wage earners; 4,461, or 1.2 per cent, were proprietors and officials; and 4,430, or 1.1 per cent, were clerks, this class including other subordinate salaried employees. Of the total number, 221,299, or 57.1 per cent, were males, and 166,472, or 42.9 per cent, were females. Of the clerks, 23 per cent were females, and of the wage earners over 16 years of age, 43.2 per cent. The average number of children under 16 years of age employed as wage earners was 39,306, of whom nearly one-half were girls. Children constituted 10.4 per cent of the total number of wage earners. The larger proportion of proprietors and officials in the cotton small wares branch of the industry is in part due to the generally smaller size of the establishments.

In order to compare the distribution of the persons engaged in the industry according to occupational status

in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 5.

CLASS.	1909		1904		Per cent of increase, ¹ 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	387,771	100.0	323,287	100.0	19.9
Proprietors and firm members.....	377	0.1	432	0.1	-12.7
Salaried employees.....	8,514	2.2	6,981	2.2	22.0
Wage earners (average number).....	378,880	97.7	315,874	97.7	19.9

¹ A minus sign (-) denotes decrease.

Each of the three classes shown in the table represented the same proportion of the total in both census years.

Table 6 shows the average number of wage earners in the industry as a whole, distributed according to age, and in the case of those 16 years and over, according to sex, for 1909, 1904, and 1899.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	378,880	100.0	315,874	100.0	302,861	100.0
16 years of age and over.....	339,574	89.6	275,446	87.2	262,603	86.7
Male.....	192,930	50.9	147,283	46.6	135,721	44.8
Female.....	146,644	38.7	128,163	40.6	126,882	41.9
Under 16 years of age.....	39,306	10.4	40,428	12.8	40,258	13.3

The percentages of women and children employed decreased during each of the intercensal periods covered by the table, though the actual number of women employed was greater in 1909 than in either of the two earlier years.

The average number of wage earners in each state in 1909, 1904, and 1899 is given in Table 45. The distribution of the average number by sex and age is not shown for the individual states, but Table 46 gives such a distribution of the number employed on December 15, 1909, or the nearest representative day. The largest number of female wage earners employed in any state was 51,238 in Massachusetts, and the next largest number, 19,052, in North Carolina.

In three of the Southern states—Alabama, North Carolina, and South Carolina—nearly 19 per cent of all wage earners in the industry in 1909 were children under 16 years of age. In Massachusetts, the leading state in the industry, however, only 5.7 per cent were children.

The proportion of women employed was much larger in Massachusetts, New Hampshire, and Rhode Island than in the Southern states shown, the percentage in New Hampshire being 48.3, that in Rhode Island 43.3, and in Massachusetts 43.1.

Table 9 shows further that in the two foremost states, Massachusetts and North Carolina, the greatest activity occurred during December, while for South Carolina, the third state in respect to number of wage earners, the largest number was reported for July. In most of the states for which figures can be presented, however, there was no considerable variation in the number employed during the year. The months of maximum and minimum employment for 1909 and the number of wage earners reported for these months are given for 21 states in Table 46.

Prevailing hours of labor.—In Table 10 the wage earners in the cotton manufacturing industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

STATE.	In establishments with prevailing hours—							
	Total.	48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States...	378,880	304	2,879	571	190,998	119,226	64,687	215
Alabama.....	12,731		36		477	7,320	4,814	84
Connecticut....	14,360		33		13,448	879		
Georgia.....	27,803	304	105		519	10,868	15,913	94
Illinois.....	1,319		887		96	336		
Indiana.....	1,582				38	1,544		
Kentucky.....	1,044					858	186	
Maine.....	14,634				1,118	13,516		
Maryland.....	3,966					3,966		
Massachusetts..	108,914		11	41	108,766	38	58	
Mississippi....	2,645				118	1,434	1,093	
New Hampshire..	22,290				22,290			
New Jersey....	6,638		3		5,537	1,098		
New York.....	10,663		247	17	1,277	7,499		
North Carolina..	47,231				52	39,680		
Pennsylvania..	16,293		1,112		8,294	6,887		
Rhode Island...	28,796			34	28,658	94		
South Carolina..	45,454		445			45,009		
Tennessee.....	3,078			65		1,333	1,643	37
Texas.....	1,590					397	1,193	
Vermont.....	683			21		662		
Virginia.....	5,057					5,057		

Practically one-half (50.4 per cent) of the wage earners employed in the cotton manufacturing industry in 1909 were in establishments where the prevailing hours were between 54 and 60 per week, and nearly one-third (31.5 per cent) were employed in establishments where the hours were 60 per week, these two classes of establishments giving employment to 81.9 per cent of the total number of wage earners in the industry. Only 1 per cent of the total were employed in establishments where the usual hours were 54 or less per week, and 17.1 per cent in establishments where more than 60 hours per week were required,

practically all of these latter being in Southern states. All of the wage earners in New Hampshire and nearly all of those in Massachusetts, Rhode Island, and Connecticut were in establishments where the prevailing hours were more than 54 but less than 60 per week, 90.7 per cent of the total number of wage earners in this group being reported from these four states. On the other hand, 84 per cent of the 47,231 wage earners in North Carolina and 57.2 per cent of the 27,803 wage earners in Georgia were employed in establishments where the prevailing hours of labor per week were more than 60 but less than 72, while 99 per cent of the wage earners in South Carolina were in establishments operating on a 60-hour basis.

CHARACTER OF OWNERSHIP.

Table 11 presents statistics with respect to the character of ownership of the establishments in the cotton manufacturing industry.

CHARACTER OF OWNERSHIP.	Value of products.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	1,324	1,154	\$628,391,813	\$450,467,704
Individual.....	110	114	11,489,389	11,834,968
Firm.....	101	118	18,132,188	20,706,429
Corporation.....	1,113	922	598,770,236	417,926,307
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	8.3	9.9	1.8	2.6
Firm.....	7.6	10.2	2.9	4.6
Corporation.....	84.1	79.9	95.3	92.8

¹ Includes one establishment under "other" ownership, to avoid disclosure of individual operations.

Of the total number of mills reported for the industry in 1909, 84.1 per cent were under corporate ownership, as compared with 79.9 per cent in 1904; of the total value of products the corporate establishments contributed 95.3 per cent in 1909 and 92.8 per cent in 1904. These figures indicate a slight gain during the five-year period in the relative importance, as measured by value of products, of establishments under corporate ownership.

Of the total number of wage earners reported for the cotton manufacturing industry in 1909, 5,366, or 1.4 per cent, were employed in establishments under individual ownership; 11,250, or 3 per cent, in those under firm ownership; and 362,264, or 95.6 per cent, in those owned by corporations.

Table 12 gives statistics for establishments classified according to form of ownership for each state in which an average of more than 500 wage earners were employed in 1909 for which figures can be shown without disclosing individual operations.

Table 12

COTTON GOODS, INCLUDING COTTON SMALL WARES: 1909

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individu-als.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.
United States	110	101	1,113	5,366	11,250	382,284	\$11,489,389	\$18,132,188	\$588,770,236	\$4,811,009	\$7,519,105	\$245,052,229
Alabama			51			12,731			22,211,748			7,838,501
Connecticut	7	7	38	457	367	13,536	1,215,338	487,231	22,529,312	436,251	195,691	11,640,217
Georgia	6	2	108	884	(X)	26,919	<i>1,868,939</i>	(X)	46,172,878	581,863	(X)	15,406,215
Illinois			5			1,319			<i>2,111,208</i>			1,009,194
Indiana			7			1,582			2,501,598			831,601
Kentucky	1		3	(X)		<i>1,044</i>	(X)		<i>1,902,467</i>	(X)		<i>714,538</i>
Maine			16			14,634			21,932,225			10,541,746
Maryland		1	15	(X)		<i>3,266</i>	(X)		<i>5,622,293</i>	(X)		<i>1,610,659</i>
Massachusetts	12	13	157	643	1,593	106,678	1,181,169	2,321,164	182,959,980	380,666	1,012,783	79,812,070
Mississippi			14			2,645			3,102,398			1,060,248
New Hampshire	1	1	19	(X)	(X)	<i>22,290</i>	(X)	(X)	<i>55,601,880</i>	(X)	(X)	<i>14,477,980</i>
New Jersey	5	4	17	78	288	6,272	117,072	403,415	13,208,387	62,023	128,416	4,973,702
New York	8	6	33	110	309	10,244	579,535	790,762	18,981,258	236,676	408,243	7,980,147
North Carolina	9	10	262	648	943	45,640	924,409	1,354,931	70,401,045	354,830	485,928	23,152,055
Pennsylvania	48	43	84	2,424	3,540	10,329	5,355,654	6,602,563	21,958,816	2,609,366	2,672,054	9,878,588
Rhode Island	8	12	86	62	3,604	25,120	163,448	5,092,593	45,056,556	61,592	2,343,253	22,506,513
South Carolina	3		144	94		45,360	195,618		65,733,967	49,859		24,576,288
Tennessee	1	1	15	(X)	(X)	<i>3,078</i>	(X)	(X)	<i>5,200,791</i>	(X)	(X)	<i>1,887,119</i>
Texas			13			1,590			<i>2,814,581</i>			<i>1,021,285</i>
Virginia			10			5,057			7,489,653			2,790,630

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

The corporate form of ownership was the only form reported in seven of the states listed and was the prevailing form in all of them. Pennsylvania was the only state in which establishments under individual and firm ownership formed any considerable proportion of the total. In that state, however, these two groups constituted 27.4 per cent and 24.6 per cent, respectively, of the total number of establishments, employed 14.9 per cent and 21.7 per cent, respectively, of the total number of wage earners, and contributed 15.8 per cent and 19.5 per cent, respectively, of the total value of products.

SIZE OF ESTABLISHMENTS.

Classification by value of products.—Table 13 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	COTTON GOODS, INCLUDING COTTON SMALL WARES.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	1,324	1,154	\$628,391,813	\$450,487,704
Less than \$5,000	17	26	41,056	67,549
\$5,000 and less than \$20,000	66	47	840,504	595,358
\$20,000 and less than \$100,000	280	273	17,137,769	15,698,309
\$100,000 and less than \$1,000,000	798	709	278,026,841	236,222,358
\$1,000,000 and over	163	99	332,345,643	197,884,132
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000	1.3	2.3	(¹)	(¹)
\$5,000 and less than \$20,000	5.0	4.1	0.1	0.1
\$20,000 and less than \$100,000	21.1	23.7	2.7	3.5
\$100,000 and less than \$1,000,000	60.3	61.4	44.2	52.4
\$1,000,000 and over	12.3	8.6	52.9	43.9

¹ Less than one-tenth of 1 per cent.

Of the 1,324 establishments reported for 1909, 163, or 12.3 per cent, manufactured products valued at

\$1,000,000 or over. In 1904 there were 99 establishments of this class out of a total of 1,154, or 8.6 per cent. While such establishments represented a comparatively small proportion of the total number at both censuses, they reported 52.9 per cent of the total value of products in 1909 and 43.9 per cent in 1904. In 1909 there were included in this group 5 establishments with products valued at \$5,000,000 or over, the aggregate value of their products exceeding \$37,000,000.

In considering the increase between 1904 and 1909 in the proportion of the business controlled by large establishments, it should be borne in mind that in consequence of the marked increase which has taken place in the prices of commodities during this five-year period, establishments might pass from the next lower class into the class comprising establishments having products valued at \$1,000,000 or over without a corresponding increase in the volume of their output.

The small establishments—that is, those manufacturing products valued at less than \$20,000—constituted a very small proportion of the total number at both censuses, and the value of their products formed only one-tenth of 1 per cent of the total. The establishments with products between \$100,000 and \$1,000,000 in value constituted 60.3 per cent of the total number in 1909 and contributed 44.2 per cent of the total value of products; in 1904, however, they were the most important class as measured by value of products, reporting 52.4 per cent of the total.

The average value of products per establishment increased from \$390,353 in 1904 to \$474,616 in 1909, and the average value added by manufacture, as computed from the figures in Table 2, from \$142,298

to \$194,398, these increases being probably due in part to advances in the prices of products. The average number of wage earners, however, likewise increased, from 274 in 1904 to 286 in 1909.

Classification by number of wage earners.—Table 14 classifies the establishments in the cotton manufacturing industry in 21 of the leading states according to the number of wage earners employed.

Table 14

COTTON GOODS, INCLUDING COTTON SMALL WARES: 1909

STATE.	Total.		Establishments employing—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
	Estab-lish-ments.	Wege earners (average number)	Estab-lish-ments.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.	1,324	378,880	3	37	118	102	1,302	181	6,534	224	16,317	380	58,842	213	78,793	127	88,745	77	180,131
Alabama.....	51	12,731						7	292	11	776	20	3,439	7	2,599	4	3,467	2	2,158
Connecticut.....	52	14,360	1	1	2			9	287	4	340	15	2,565	12	4,040	5	2,605	3	4,497
Georgia.....	116	27,803				4	62	7	270	30	2,343	39	6,164	22	7,670	11	7,249	3	4,045
Illinois.....	5	1,319						2	96					2	600	1	623		
Indiana.....	7	1,582						2	86			2	459	3	1,037				
Kentucky.....	4	1,044						1	48			1	138	1	280	1	578		
Maine.....	16	14,634						2	81	1	55	2	395	2	790	3	2,309	6	11,004
Maryland.....	16	3,966				3	38	2	89	1	79	6	803	3	1,062	1	759	1	1,135
Massachusetts.....	182	108,914		8	25	11	134	14	488	20	1,431	21	3,519	29	11,184	40	29,019	39	63,114
Mississippi.....	14	2,645				1	9			3	218	7	1,227	3	1,191				
New Hampshire.....	21	22,290		1	1	1	9	2	55			5	792	3	1,172	4	3,550	5	16,711
New Jersey.....	26	6,638		3	10	7	81	2	89	3	249	4	692	4	1,520	2	1,501	1	2,496
New York.....	47	10,663	1	2	7	9	109	8	269	8	621	9	1,232	5	1,695	2	1,135	3	5,595
North Carolina.....	281	47,231		1	4	12	156	46	1,650	71	5,231	97	14,818	41	14,566	10	6,385	3	4,421
Pennsylvania.....	175	16,293	1	15	51	35	457	48	1,758	26	1,717	36	5,777	11	3,912	2	1,464	1	1,157
Rhode Island.....	106	28,786		4	10	10	130	15	502	15	1,080	20	3,481	25	8,895	12	7,711	5	6,977
South Carolina.....	147	45,454		1	4	4	47	6	202	13	906	60	10,738	35	12,639	25	17,281	3	3,637
Tennessee.....	17	3,078						4	146	6	404	4	650	1	299	2	1,579		
Texas.....	13	1,590				1	20			6	507	5	1,063						
Vermont.....	3	683				1	20					1	236	1	427				
Virginia.....	10	5,057						1	27	2	117	3	371	1	450	1	909	2	3,133

Of the 1,324 establishments reported for 1909, 3 employed no wage earners, 37, or 2.8 per cent, employed from 1 to 5, 21.4 per cent employed from 6 to 50, and 16.9 per cent from 51 to 100. The largest single class consisted of 360 mills employing from 101 to 250 wage earners, though 204 mills gave employment to over 500 wage earners each. Of the total number of wage earners reported, 2.1 per cent were in establishments employing from 1 to 50 wage earners, 4.3 per cent in establishments employing from 51 to 100, 15.6 per cent in establishments employing from 101 to 250, 20.3 per cent in establishments employing from 251 to 500, 23.4 per cent in establishments employing from 501 to 1,000, and 34.3 per cent in establishments employing over 1,000. Establishments employing 1,000 wage earners or more were relatively more important in Maine, New Hampshire, Virginia, Massachusetts, and New York than in any of the other states, more than half of the wage earners in each of these five states being employed in establishments of this class.

EXPENSES.

As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the

relative importance of the different classes of expenses which were reported. Table 2 shows the total expenses reported for the industry in 1909 to have been \$554,221,688, distributed as follows: Cost of materials, \$371,009,470, or 66.9 per cent; wages, \$132,859,145, or 24 per cent; salaries, \$14,411,758, or 2.6 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$35,941,315, or 6.5 per cent. In establishments making cotton goods, the proportions were: Cost of materials, 67.2 per cent; wages, 23.9 per cent; salaries, 2.5 per cent; and miscellaneous expenses, 6.4 per cent. In the cotton small wares branch of the industry, the corresponding percentages were 59.4, 26.1, 5.9, and 8.6, respectively.

Table 15 shows in percentages, by states, the distribution of the total expenses reported for the cotton manufacturing industry as a whole in 1909.

There are considerable variations in the proportions represented by the different classes of expenses in the several states, but the cost of materials constituted over three-fifths of the total in all the 21 states shown in the table except Illinois, while the proportion for wages ranged from 15.5 per cent in Ohio to 30.2 per cent in Maine. In all of the Southern states, together with Ohio, Indiana, New Jersey, New York, and Pennsylvania, the percentage represented by wages was lower than the average for the United

States as a whole (24 per cent), while in Maine, New Hampshire, Rhode Island, Connecticut, Illinois, and Massachusetts it was higher. States showing a high percentage for wages almost uniformly show a low percentage for materials, as is natural, since wages and cost of materials together make up by far the larger part of the total expenses reported. The differences in the proportions in the different states are attributable in part to differences in wage scales and in part to differences in the fineness and the degree of elaboration of the products, the manufacture of fine or highly elaborated products requiring more labor in proportion to the quantity of materials and more highly skilled labor than the manufacture of a lower grade of products.

Table 15

STATE.	COTTON GOODS, INCLUDING COTTON SMALL WARES—PER CENT OF TOTAL EXPENSES REPORTED.			
	Salaries.	Wages	Materials.	Miscellaneous expenses.
United States.....	2.6	24.0	66.9	6.5
Alabama.....	2.3	17.4	72.5	7.8
Connecticut.....	3.9	28.5	60.1	7.6
Georgia.....	2.3	17.7	73.5	6.5
Illinois.....	5.5	27.5	58.1	8.9
Indiana.....	4.3	19.7	68.9	7.1
Kentucky.....	2.2	18.6	71.7	7.6
Maine.....	1.9	30.2	60.2	7.7
Maryland.....	2.8	20.6	72.7	3.9
Massachusetts.....	2.1	27.4	63.9	6.7
Mississippi.....	3.6	23.6	69.2	3.6
New Hampshire.....	1.4	29.6	63.4	5.6
New Jersey.....	3.2	20.8	69.2	6.8
New York.....	3.2	22.7	64.0	10.1
North Carolina.....	2.5	18.5	74.1	4.9
Ohio.....	7.1	15.5	69.2	8.1
Pennsylvania.....	5.4	23.5	62.7	8.4
Rhode Island.....	3.3	29.1	62.6	5.1
South Carolina.....	2.5	20.2	71.7	5.5
Tennessee.....	2.2	17.8	69.4	10.6
Texas.....	2.4	20.0	71.6	6.0
Virginia.....	1.9	21.5	68.3	8.3
All other states.....	3.7	23.6	67.9	4.8

ENGINES, POWER, AND FUEL.

Engines and power.—The amount of power used in the cotton manufacturing industry was first reported at the census of 1869. Table 2 shows that the total primary power used in the industry as a whole increased from 146,040 horsepower in 1869 to 1,296,517 in 1909. Table 16 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power increased from 795,834 horsepower in 1899 to 1,296,517 horsepower in 1909, or 62.9 per cent. In 1909, as in 1904 and 1899, the power of steam engines constituted more than two-thirds of the total primary power, the percentage in 1909 (67.1), though somewhat less than that in 1904, being slightly greater than in 1899. Water power, which in 1899 formed nearly one-third (31.6 per cent) of the total primary power, constituted in 1909 only 23.4 per cent of the total. There was a marked increase, on the other hand, in the relative importance of power generated by electric motors operated by purchased current (rented electric power), which increased from 2,081 horsepower in 1899 to 108,512

horsepower in 1909, or from three-tenths of 1 per cent of the total primary power used in the industry to 8.4 per cent. These changes are partly attributable to the marked growth of this industry in the Southern states, where the use of rented electric power has increased most conspicuously—much of the current being generated at a low cost by water power.

Table 16

POWER.	COTTON GOODS, INCLUDING COTTON SMALL WARES.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	6,157	3,636	3,152	1,296,517	986,604	795,834	100.0	100.0	100.0
Owned.....	3,487	3,307	3,152	1,183,037	963,042	783,792	91.2	97.6	98.5
Steam.....	2,087	2,052	1,803	869,838	707,607	531,611	67.1	71.7	66.8
Gas.....	39	21	14	2,812	1,786	321	0.2	0.2	(¹)
Water wheels.....	1,352	1,234	1,335	302,238	252,323	251,850	23.3	25.6	31.6
Water motors.....	9		(²)	736		10	0.1		
Other.....				7,363	726		0.6	0.1	(¹)
Rented.....	2,670	329	(²)	113,480	23,562	12,042	8.8	2.4	1.5
Electric.....	2,670	329	(²)	108,512	14,095	2,081	8.4	1.4	0.3
Other.....				4,968	9,467	9,961	0.4	1.0	1.3
Electric motors.....	6,559	1,117	280	235,902	67,139	17,594	100.0	100.0	100.0
Run by current generated by establishment.....	3,889	788	280	127,390	53,044	15,513	54.0	79.0	88.2
Run by rented power.....	2,670	329	(²)	108,512	14,095	2,081	46.0	21.0	11.8

¹ Less than one-tenth of 1 per cent.

² Not reported.

The number and horsepower of electric motors used for distributing power by means of current generated in the establishments in the industry also show a very large increase, the horsepower of such motors increasing from 15,513 in 1899 to 127,390 in 1909.

Table 17 shows for 1909 the amount of the several kinds of power and of the different kinds of fuel used in 21 of the leading states.

The states which ranked highest with respect to the amount of power used were Massachusetts, South Carolina, North Carolina, Rhode Island, and Georgia. The total horsepower reported for these states in 1909 was 902,625, or 69.6 per cent of the total for the entire industry in the United States. Steam was the most important form of primary power in all the states shown separately except Maine and Virginia, in which states water power was used to a greater extent than any other form of power. The largest amounts of steam power (292,124 horsepower), of water power (60,510 horsepower), and of power generated by gas and other internal-combustion engines (1,736 horsepower), were reported for the state of Massachusetts. The largest amount of rented electric power, 43,239 horsepower, or nearly two-fifths of the total for the United States, was reported for North Carolina, with South Carolina following closely. In North Carolina over one-fourth of the total primary power was rented electric power and in South Carolina nearly one-fifth.

Some cotton mills confine themselves to spinning, selling the yarn to other mills for weaving, while others do weaving only, or spin only part of the yarn they weave. The state of Pennsylvania is the largest user of purchased cotton yarn, reporting 36.9 per cent of the total quantity purchased by all mills in the industry in 1909, 39.1 per cent in 1904, and 42.2 per cent in 1899. Much of this yarn is of course made in other states. The cost of the purchased yarn used by the Pennsylvania mills in 1909 was nearly four times as great as that of the raw cotton used by them, while in no other state except New Jersey did the cost of yarn purchased equal that of raw cotton. Massachusetts, the second state in the use of this material, reported 27,175,076 pounds of purchased cotton yarn in 1909, or 21.4 per cent of the total. Rhode Island, New Jersey, and North Carolina were the states next in importance.

The consumption of silk yarn (organzine and tram) and spun silk yarn shows large gains, the total quantity of the two combined reported for 1909 being nearly four times the quantity used in the cotton

manufacturing industry in 1899. Massachusetts reported more than half of the total quantity in 1909.

The mills in Rhode Island used 36.5 per cent of the entire amount of cotton waste reported for 1909 and 58.9 per cent of that reported for 1904, Massachusetts, Georgia, and North Carolina, in the order named, being the next largest users in 1909.

The cost of chemicals and dyestuffs, as reported at the census of 1909, was \$4,886,514, as compared with \$5,718,107 in 1899. The figures, however, do not cover the total cost of these materials, as in some cases their cost was not reported separately.

Consumption of cotton, by states.—Table 20 shows the consumption of foreign and domestic cotton in the industry designated "cotton goods, including cotton small wares" for the census years 1909, 1904, 1899, and 1889 (the reports of most establishments being for the calendar years). It shows also the total consumption of cotton in the two branches of the industry, in certain groups of states, and in the most important individual states.

Table 20

COTTON CONSUMPTION IN COTTON MANUFACTURES AS A WHOLE.

	1909		1904		1899		1889	
	Bales.	Pounds.	Bales.	Pounds.	Bales.	Pounds.	Bales.	Pounds.
Total	4,828,736	2,335,344,906	3,749,765	1,876,437,160	3,646,708	1,817,643,390	2,261,600	1,117,945,776
Domestic.....	4,717,343	2,259,312,974	3,690,145	1,832,736,744	3,570,500	1,761,798,458	2,252,668	1,111,384,825
Other than sea island.....	1 4,649,594	2,233,038,701	3,635,761	1,810,874,712	3,523,293	1,743,355,824	2,231,385	1,103,492,910
Sea island.....	1 67,749	1 26,274,273	54,384	21,862,032	47,207	18,442,634	21,283	7,891,915
Foreign.....	111,393	76,031,932	59,620	43,700,406	76,208	55,844,932	8,932	6,560,951
BRANCHES OF THE INDUSTRY.								
Cotton goods.....	4,822,405	2,332,262,636	3,743,089	1,873,074,716	3,639,495	1,814,002,512	(2)	(2)
Cotton small wares.....	6,331	3,082,270	6,676	3,362,434	7,213	3,640,878	(2)	(2)
STATE GROUPS.								
Cotton-growing states.....	2,469,208	1,162,969,470	1,829,337	891,944,186	1,479,006	707,842,111	526,856	250,837,646
New England states.....	2,041,734	1,014,926,193	1,647,207	846,023,549	1,829,578	940,908,114	1,426,958	714,691,714
All other states.....	317,794	157,449,243	273,221	138,469,415	338,024	168,893,165	308,786	152,416,416
PRINCIPAL STATES.								
Alabama.....	241,073	116,232,495	199,806	99,100,678	134,371	67,987,299	29,962	14,726,454
Connecticut.....	117,189	57,723,360	104,025	53,278,482	109,111	56,865,809	104,655	52,267,968
Georgia.....	529,726	250,820,180	406,001	198,108,953	304,431	145,833,115	145,859	69,139,410
Maine.....	180,650	78,678,643	131,578	67,509,692	157,428	79,765,573	132,504	65,717,252
Maryland.....	57,358	27,460,792	53,794	27,054,032	80,954	39,901,955	55,026	27,265,667
Massachusetts.....	1,244,614	622,368,027	955,965	489,989,585	1,085,236	560,984,204	772,520	386,767,326
Mississippi.....	34,202	16,371,192	25,640	13,007,625	20,962	10,363,458	17,366	8,449,834
New Hampshire.....	285,659	138,532,627	262,894	134,809,578	271,629	136,988,647	214,034	107,319,124
New Jersey.....	34,354	18,400,527	33,358	16,319,367	29,644	15,287,868	25,723	12,301,151
New York.....	141,003	68,766,704	100,924	51,835,100	102,590	52,243,049	78,824	39,522,057
North Carolina.....	754,483	350,210,614	503,560	242,360,738	404,535	190,138,759	114,371	53,546,289
Pennsylvania.....	50,691	25,688,597	50,918	25,873,720	76,425	36,549,533	92,705	44,629,588
Rhode Island.....	223,670	112,757,027	183,132	95,548,635	193,226	99,475,478	193,291	97,982,155
South Carolina.....	690,834	324,385,778	558,100	270,957,461	485,234	230,053,807	133,342	64,000,600
Tennessee.....	68,574	28,312,077	38,332	19,292,275	30,273	15,040,336	33,114	15,779,360
Texas.....	32,686	15,893,288	18,055	9,206,689	18,045	9,304,434	(3)	(3)
Virginia.....	78,017	37,160,966	46,296	23,018,074	38,118	17,832,465	22,731	10,616,206
All other states 4.....	94,053	45,582,012	77,387	39,166,666	104,496	53,027,601	95,573	47,925,335

1 The figure given for sea-island cotton represents the total consumption in all industries during the year ending August 31, 1909, and that for "other than sea island" is obtained by subtracting this figure from the total for domestic cotton.

2 Not reported separately.

3 Included under "all other states."

4 Includes the following:

1909—Arkansas, Delaware, Illinois, Indiana, Kansas, Kentucky, Louisiana, Missouri, Vermont, and Wisconsin.

1904—Arkansas, California, Delaware, Illinois, Indiana, Kentucky, Louisiana, Missouri, Vermont, and Wisconsin.

1899—Arkansas, California, Colorado, Delaware, Illinois, Indiana, Kentucky, Louisiana, Missouri, Nebraska, Vermont, West Virginia, and Wisconsin.

1889—Arkansas, California, Delaware, Illinois, Indiana, Iowa, Kentucky, Louisiana, Missouri, Ohio, Texas, Vermont, and Wisconsin.

The consumption of sea-island cotton in 1909 was not reported separately in connection with the census of manufactures, but the total consumption in the United States for the year ending August 31, 1909, was 67,749 bales, and presumably about the same amount was used during the year covered by the census of man-

ufactures. Practically all of this kind of cotton was used in the manufacture of thread, lace, and other goods where strength and fineness are indispensable.

One of the most important points brought out by the table is the marked increase in cotton consumption in the cotton-growing states and the consequent

decrease in the relative importance of the older manufacturing sections. In 1889 the New England states reported 63.9 per cent of the total cotton consumption for the industry, but the proportion had decreased to 51.8 per cent in 1899, to 45.1 per cent in 1904, and to 43.5 per cent in 1909. In like manner the proportion for all states other than the New England states and the cotton growing states, which was 13.6 per cent in 1889, decreased to 9.3 per cent in 1899, to 7.4 per cent in 1904, and to 6.7 per cent in 1909. On the other hand, the cotton growing states, which comprise Virginia, Kentucky, Missouri, Kansas, Oklahoma, and the states south, reported 22.4 per cent of the total consumption in 1889, 38.9 per cent in 1899, 47.5 per cent in 1904, and 49.8 per cent in 1909.

The percentage of increase in the amount of cotton consumed in the cotton-growing states was 182.2 per cent for the decade 1889-1899 and 64.3 per cent for the decade 1899-1909. For the New England states the corresponding increases were 31.7 per cent and 7.9 per cent, respectively, while the consumption by all the remaining states taken as a group increased 10.8 per cent during the former period, but decreased 6.8 per cent during the latter. For the New England states the actual increase in cotton consumption during the decade 1899-1909 was about 74,000,000 pounds. For the separate states the largest actual increase, about 160,000,000 pounds, is shown for North Carolina, but

Virginia shows the highest rate of increase among the states shown separately in Table 20—108.4 per cent.

Massachusetts was in 1909, as it had been in prior census years, the largest consumer of cotton, 1,244,614 bales, or 622,368,027 pounds, being used in the cotton manufacturing industry of the state during the year. This amount was 27 per cent greater than that reported in 1904. By reason of labor troubles, the year 1904 was one of low consumption of cotton in Fall River—the most important cotton manufacturing city in the country—and this accounted for the decrease in Massachusetts for the five-year period 1899-1904. For the decade 1899-1909 Massachusetts showed a gain of 10.9 per cent. North Carolina was the next largest user of cotton in 1909, having displaced South Carolina, which held second place in 1904 and 1899. The increase in consumption in this state from 1899 to 1909 was 84.2 per cent. South Carolina was third, Georgia fourth, and New Hampshire fifth in order in 1909, their consumption of cotton having increased during the decade 41 per cent, 72 per cent, and 1.1 per cent, respectively.

PRODUCTS.

Summary for the United States.—Table 21 gives in detail for the United States the quantity and value of the various products reported by establishments in the cotton manufacturing industry for 1909, 1904, and 1899.

PRODUCT.	COTTON GOODS, INCLUDING COTTON SMALL WARES.			PRODUCT.	COTTON GOODS, INCLUDING COTTON SMALL WARES.		
	1909	1904	1899		1909	1904	1899
Total value	\$628,391,813	\$450,467,704	\$339,200,320				
Woven goods:				Woven goods—Continued.			
Square yards.....	6,348,568,593	5,110,308,812	4,523,430,616	Mosquito and other netting—			
Value.....	\$456,089,401	\$324,747,837	\$243,253,155	Square yards.....	59,100,819	36,232,918	41,885,023
Plain cloths for printing or converting—				Value.....	\$2,103,500	\$794,953	\$875,868
Square yards.....	2,224,677,848	1,818,216,172	1,581,613,827	Upholstery goods—			
Value.....	\$111,097,889	\$80,311,612	\$57,780,940	Square yards.....	94,840,051	65,692,212	51,314,609
Brown or bleached sheetings and shirtings—				Value.....	\$14,882,842	\$12,111,698	\$8,705,384
Square yards.....	1,484,353,529	1,172,309,182	1,212,403,048	Tapestries (piece goods and curtains)—			
Value.....	\$88,802,985	\$61,253,376	\$55,513,032	Square yards.....	10,657,385	9,605,006	10,166,538
Twills and satens—				Value.....	\$4,723,907	\$4,242,506	\$4,158,600
Square yards.....	388,314,961	366,142,513	235,860,518	Lace and lace curtains—			
Value.....	\$34,274,107	\$23,701,305	\$14,301,302	Square yards.....	81,007,314	53,511,222	37,825,198
Fancy woven fabrics—				Value.....	\$8,922,082	\$7,208,211	\$3,585,138
Square yards.....	426,710,359	306,254,685	237,841,603	Other—			
Value.....	\$47,498,713	\$28,486,342	\$21,066,310	Square yards.....	3,175,352	2,475,984	3,322,873
Ginghams—				Value.....	\$1,236,853	\$660,981	\$961,646
Square yards.....	537,430,463	302,316,132	278,392,708	Bags and bagging—			
Value.....	\$37,939,040	\$22,471,867	\$16,179,200	Square yards.....	63,107,568	67,067,663	32,739,616
Duck—				Value.....	\$4,862,451	\$3,953,732	\$2,554,192
Square yards.....	162,476,322	122,601,212	129,234,076	Cotton towels and toweling—			
Value.....	\$27,485,892	\$17,005,982	\$14,263,008	Square yards.....	52,778,170	40,280,292	(²)
Drills—				Value.....	\$6,037,075	\$4,365,470	(²)
Square yards.....	238,869,407	194,735,303	237,206,549	Tape and webbing.....	\$5,531,674	\$4,060,488	\$2,521,402
Value.....	\$17,750,151	\$12,596,063	\$11,862,794	Yarns for sale:			
Ticks, denims, and stripes—				Pounds.....	470,370,995	364,634,753	332,302,621
Square yards.....	264,870,508	256,375,486	181,800,853	Value.....	\$109,314,953	\$79,939,687	\$55,216,066
Value.....	\$27,350,162	\$23,797,578	\$16,446,633	Thread:			
Cottonades—				Pounds.....	23,700,957	17,163,741	15,007,058
Square yards.....	25,676,286	25,362,346	26,323,947	Value.....	\$20,516,269	\$15,043,043	\$11,908,671
Value.....	\$3,343,533	\$2,993,971	\$2,791,431	Twine:			
Napped fabrics—				Pounds.....	13,715,771	7,301,569	11,642,718
Square yards.....	305,655,864	330,808,140	268,852,716	Value.....	\$2,417,391	\$1,428,994	\$1,546,611
Value.....	\$25,695,367	\$26,108,315	\$18,231,044	Cordage and rope:			
Corduroy, cotton velvet, and plush—				Pounds.....	7,603,907	(²)	(²)
Square yards.....	19,706,438	16,014,556	7,961,523	Value.....	\$1,164,526	(²)	(²)
Value.....	\$6,965,634	\$4,790,573	\$2,082,017	Cotton waste for sale:			
				Pounds.....	310,513,348	247,649,640	270,862,613
				Value.....	\$10,874,386	\$10,062,057	\$5,563,570
				All other products.....	\$22,483,213	\$15,185,598	\$19,190,845

¹ In addition, cotton goods to the value of \$2,224,086 were made by establishments engaged primarily in the manufacture of products other than cotton goods.

² Not reported separately.

The total value of all products reported by establishments in the industry designated "cotton goods, including cotton small wares," in 1909 was \$628,391,-

813, a gain of \$177,924,109, or 39.5 per cent, over 1904, and \$289,191,493, or 85.3 per cent, over 1899. The total value includes, as already stated, much duplica-

tion, and the increase shown is due in part to the higher prices prevailing in 1909. The total number of square yards of fabrics woven by establishments in the industry increased 24.2 per cent between 1904 and 1909 and 40.3 per cent between 1899 and 1909. The value of woven goods in 1909 represented a little less than three-fourths of the total value of all products.

Plain cloths for printing or converting comprise by far the most important class of woven goods, as measured by quantity, constituting, in 1909, 35 per cent of the total. Brown and bleached sheetings and shirtings ranked second, followed by gingham, fancy woven fabrics, twills and sateens, and napped fabrics, in the order named, the production of each of these classes of cloths being more than 300,000,000 square yards in 1909.

The output of plain cloths for printing or converting increased 40.7 per cent between 1899 and 1909, and its value 92.3 per cent. The output of sheetings and shirtings increased 22.4 per cent, and their value 60 per cent. For these, as for practically all the other classes of products, the percentage of increase in value was much greater than that in quantity. The decrease in the production of sheetings and shirtings between 1899 and 1904 was largely attributable to the prolonged labor disturbances in the cotton mills of Massachusetts in the latter year.

With one exception—napped fabrics—all classes of woven goods show an increase in quantity of output from 1904 to 1909, although the output of several classes was less in 1904 than in 1899, and that of two classes—cottonades and “other” upholstering goods—was less in 1909 than in 1899. The highest relative increase during the decade was in corduroy, cotton velvet, and plush, the production of which in 1909 was 147.5 per cent greater than in 1899, and the value 159.7 per cent greater. The production of gingham increased 93 per cent during the decade, that of upholstering goods 84.8 per cent, and that of fancy woven fabrics 79.4 per cent. The quantity of duck woven increased 25.7 per cent between 1899 and 1909, and the value increased 92.7 per cent. The total production of duck in 1909 included 8,658,111 square yards of sailcloth, valued at \$1,710,631, as compared with 9,586,519 square yards, valued at \$1,540,745, in 1904, and 11,750,151 square yards, valued at \$2,216,371, in 1899—the decrease for sailcloth during the decade being 26.3 per cent in quantity and 22.8 per cent in value.

The most important products of the industry, other than woven fabrics, are yarns, thread, and cotton waste. The value of the yarns made for sale as such in 1909 was \$109,314,953, or more than one-sixth of the total value of products of the industry. A considerable part of this yarn was sold to other establishments in the same industry. The quantity of yarn reported as produced for sale in 1909 was 470,370,995 pounds, while the quantity of yarn reported as purchased by cotton mills was 126,707,003 pounds. Much

of the yarn made by the cotton mills is sold to hosiery and knit goods factories, the consumption of purchased cotton yarn by such factories in 1909 being 216,987,611 pounds, and some is sold to factories in still other textile industries. The quantity of yarn reported as manufactured for sale increased 138,068,374 pounds, or 41.5 per cent, during the decade, while the value increased 98 per cent. The amount of thread manufactured increased 49 per cent, and its value 72.3 per cent.

In addition to the products shown in Table 21 for cotton manufacturing industry, cotton manufactures of similar character to the value of \$2,224,096 were reported for 1909 by establishments engaged primarily in other industries. On the other hand, the total value of products reported for 1909 for the cotton manufacturing industry proper covered products other than cotton goods and cotton small wares to the value of \$7,688,866.

Table 22 shows the total value of all cotton manufactures, and the total quantity and value of certain specific classes of goods, including all of those which were reported as secondary products by establishments engaged primarily in industries other than cotton manufacturing, except that the total production of cotton twine and cotton cordage and rope is shown in Table 23. The quantities and values of the cotton goods and cotton small wares produced by establishments in other industries, which are included in Table 22, do not enter into the statistics presented in any subsequent tables.

	PRODUCTION: 1909	
	Quantity.	Value.
All products of the cotton manufacturing industry—"Cotton goods, including cotton small wares".		\$628,391,813
Products other than cotton goods and cotton small wares ¹		7,688,866
Cotton goods and cotton small wares made in establishments in the cotton manufacturing industry.....		620,702,947
Cotton goods and cotton small wares made in establishments in other industries ²		2,224,096
Total production of cotton goods and cotton small wares.....		622,927,043
	<i>Square yards.</i>	
Plain cloths for printing or converting.....	2,224,806,423	111,123,604
Brown or bleached sheetings and shirtings.....	1,485,813,885	88,890,888
Fancy woven fabrics.....	427,409,747	47,650,030
Duck.....	162,823,644	27,590,089
Cottonades.....	25,965,026	3,411,736
Upholstery goods:		
Tapestry.....	11,006,869	4,821,096
Lace and lace curtains.....	86,447,827	10,010,185
Other.....	3,281,363	1,264,546
Cotton towels and toweling.....	52,807,543	6,066,449
	<i>Pounds.</i>	
Tape and webbing.....	9,711,482	5,559,099
Yarns for sale.....	470,958,108	109,400,376
Thread.....	24,095,154	20,650,616
All other.....		186,488,329

¹ Includes products manufactured primarily in the following industries: Bags, other than paper; carpets and rugs, other than rag; cordage and twine and jute and linen goods; dyeing and finishing textiles; foundry and machine-shop products; furnishing goods, men's; gas, illuminating and heating; hammocks; hosiery and knit goods; house-furnishing goods; ice, manufactured; mattresses and spring beds; millinery and lace goods; shoddy; silk and silk goods, including throwsters; woolen, worsted, and felt goods, and wool hats.

² Includes products made by establishments in the following industries: Carpets and rugs, other than rag; clothing, men's, including shirts; cordage and twine and jute and linen goods; furnishing goods, men's; gas and electric fixtures and lamps and reflectors; haircloth; oil, castor; patent medicines and compounds and druggists' preparations; rubber goods, not elsewhere specified; upholstering materials; woolen, worsted, and felt goods, and wool hats.

The New England states reported nearly three-fourths of all the fine yarn produced in 1909, Massachusetts alone reporting 41.5 per cent of the total. Rhode Island ranked second in the production of fine yarn, North Carolina third, and Connecticut fourth. The total quantity reported in 1909 was 103.7 per cent greater than in 1899. The rapid increase in the production of yarn of this grade in North Carolina and some of the other Southern states is noteworthy.

The production of medium yarn (No. 21 to No. 40) shows an increase of 60.4 per cent for the decade 1899-1909. Massachusetts led in the production of this grade as well as of fine yarn, reporting nearly one-third of the total for the United States in 1909. South Carolina ranked second, North Carolina third, and Rhode Island fourth, these four states together furnishing about seven-tenths of the total quantity reported.

The output of coarse yarn (No. 20 and under) increased 26.2 per cent between 1904 and 1909, but a decrease took place during the five-year period 1899-1904, and the net increase for the decade was only 19.3 per cent. Georgia led in the amount of coarse yarn spun in 1909, with North Carolina second, Massachusetts third, and South Carolina fourth.

EQUIPMENT.

Spindles.—Although the number of spindles reported is not a strictly accurate index of the growth of the cotton industry, because of their different speeds and their use upon different grades of yarn, it is one of the best standards available and is the most generally accepted measure of progress. "Producing" spindles are those which are used in the production of yarn as distinguished from "doubling" and "twisting" spindles, which, as the name implies, twist two or more yarns together into a single strand. A spindle is termed "active" if it has been in operation at any time during the census year.

Table 27 gives, by geographic divisions, for 1909, 1904, and 1899, the number of active producing spindles in the cotton mills, exclusive of mills in the cotton small wares branch of the industry.

DIVISION.				Increase. ²	
	1909	1904	1899		
				1904-1909	1899-1904
United States.....	27,395,800	23,155,613	19,008,352	4,240,187	4,147,261
New England.....	15,383,909	13,911,241	12,850,987	1,472,668	1,060,254
Middle Atlantic.....	1,451,323	1,407,495	1,458,635	43,828	-51,140
East North Central.....	150,336	164,388	155,472	-14,052	8,916
South Atlantic.....	8,867,749	6,395,901	3,695,769	2,471,848	2,700,132
East South Central.....	1,338,201	1,113,006	676,979	225,196	436,027
West South Central.....	170,938	141,066	114,056	29,872	27,010
All other.....	33,344	22,516	56,454	10,828	-33,938

¹ Not including mills in the cotton small wares branch of the industry.

² A minus sign (-) denotes decrease.

The New England division reported 56.2 per cent of the entire number of active producing spindles in the cotton mills of the United States in 1909, as compared with 67.6 per cent in 1899, showing a considerable decrease in relative importance in this respect, notwithstanding an increase of 19.7 per cent in the total number of producing spindles during the decade. The South Atlantic division reported 32.4 per cent of the total number of active producing spindles in 1909 and 19.4 per cent in 1899 the increase during the decade being 139.9 per cent. The numerical gain in the South Atlantic division during the decade was 5,171,980, as compared with 2,532,922 in the New England division. The number of active producing spindles in the East South Central division increased 97.7 per cent from 1899 to 1909, but in the Middle Atlantic division the number in 1909 was slightly less than that in 1899.

Table 28 shows the number of active producing cotton spindles in the several textile industries, by geographic divisions and states, for 1909 and 1899, with the total for all textile industries for 1889 also.

The total number of cotton spindles in the principal textile industries in 1909 was 28,178,862, of which 27,425,608 were in the cotton mills, including a comparatively small number in mills making cotton small wares. The increase in the number of spindles from 1889 to 1899 was 5,079,804, or 35.3 per cent, and from 1899 to 1909, 8,714,878, or 44.8 per cent. The greatest percentage of increase in any industry from 1899 to 1909 was in the hosiery and knit-goods industry—134.8 per cent. A decrease is shown in the number of cotton spindles in the woolen and worsted mills and the carpet and rug factories combined.

Eight states—Georgia, the two Carolinas, and all the New England states except Vermont—reported over 1,000,000 active producing spindles in 1909. Massachusetts, the leading state, with 9,637,601 spindles, shows a gain of 1,705,930, or 21.5 per cent, for the 10-year period 1899-1909. South Carolina reported the greatest absolute and relative increase during the decade, the gain being 2,323,922 spindles, or 161.7 per cent. In North Carolina the increase was 1,820,907 spindles, or 160.1 per cent. The percentages of gain for the decade for the other states which reported a million or more spindles in 1909 are as follows: Georgia, 113.3 per cent; Maine, 21.3 per cent; Connecticut and Rhode Island, 20.3 per cent each, and New Hampshire, 6.1 per cent. Six states shown in the table reported fewer spindles in 1909 than in 1899, namely, Delaware, Maryland, New Jersey, Pennsylvania, Vermont, and Wisconsin.

Of the total number of cotton spindles in the hosiery and knit-goods industry, 195,089, or 40.4 per cent, were reported from the Middle Atlantic states, most of these being in the state of New York.

show decreases in the number of mule spindles reported for 1909, as compared with the number in 1899.

The use of mule spindles is confined chiefly to the Northern states. In 1909 the number in Massachusetts, 2,090,211, represented more than two-fifths of the total number of mule spindles in the United States and more than one-fifth of the total number of all spindles in that state. The proportion of mule spindles, however, was considerably higher in some of the other states, including Connecticut, New Jersey, New York, Pennsylvania, and Rhode Island, about three-fourths of the spindles in New Jersey in 1909 being mule spindles. Apparently, however, the purchase and installation of mule spindles have practically ceased, for in the states where most of the cotton mills are comparatively new the number of mule spindles is relatively insignificant. In South Carolina, which has more spindles than any other state except Massachusetts, mule spindles constituted in 1909 less than 1 per cent of the total number of spindles.

In addition to the active spindles reported there were 523,911 idle "producing" spindles in active cotton mills in 1909, statistics for which are given in Table 30.

STATE.	IDLE SPINDLES IN THE COTTON MANUFACTURING INDUSTRY: 1909		
	Total.	Ring.	Mule.
United States.....	523,911	433,312	90,599
Alabama.....	18,844	18,844	.....
Connecticut.....	2,816	1,344	1,472
Georgia.....	30,477	30,477	.....
Indiana.....	1,248	1,248	.....
Louisiana.....	19,168	19,168	.....
Maine.....	8,496	8,496	.....
Maryland.....	3,660	3,660	.....
Massachusetts.....	65,972	51,165	14,807
Mississippi.....	7,544	.....	7,544
New Hampshire.....	114,273	113,803	470
New Jersey.....	8,995	8,139	856
New York.....	7,104	7,104	.....
North Carolina.....	80,626	64,690	15,936
Pennsylvania.....	14,620	6,120	8,500
Rhode Island.....	40,495	10,457	30,038
South Carolina.....	73,010	73,010	.....
Tennessee.....	3,150	3,150	.....
Texas.....	224	224	.....
Vermont.....	13,472	2,496	10,976
Virginia.....	600	600	.....
All other states.....	9,117	9,117	.....

In addition to the active producing cotton spindles, the cotton mills reported, in 1909, 2,061,603 doubling and twisting spindles, and 5,044 producing spindles using fibers other than cotton. Table 31 shows the doubling and twisting spindles distributed by geographic divisions and states.

DIVISION AND STATE.	Doubling and twisting spindles in the cotton manufacturing industry: 1909	DIVISION AND STATE.	Doubling and twisting spindles in the cotton manufacturing industry: 1909
United States.....	2,061,603	South Atlantic.....	707,109
New England.....	985,648	Maryland.....	42,444
Maine.....	24,570	Virginia.....	300
New Hampshire.....	42,162	North Carolina.....	358,415
Vermont.....	220	South Carolina.....	139,224
Massachusetts.....	548,957	Georgia.....	166,726
Rhode Island.....	226,373	South Central.....	115,468
Connecticut.....	143,366	Kentucky.....	1,792
Middle Atlantic.....	249,410	Tennessee.....	22,588
New York.....	33,110	Alabama.....	75,484
New Jersey.....	192,676	Mississippi.....	7,680
Pennsylvania.....	23,624	Arkansas.....	3,000
North Central.....	3,968	Louisiana.....	192
Ohio.....	1,600	Texas.....	4,732
Indiana.....	560		
Wisconsin.....	1,000		
Missouri.....	808		

Looms.—Table 32 gives, by geographic divisions, for 1909, 1904, and 1899, the total number of looms employed in the cotton mills (exclusive of the mills in the cotton small wares branch of the industry), classified according to the character of the fabrics on which used.

Of the total number of looms in 1909, 74.8 per cent were employed on plain cloths, 12.4 per cent on twills and sateens, 11.8 per cent on fancy weaves, and only 1 per cent on all other fabrics.

The total number of looms increased 182,281, or 40.4 per cent, during the decade. The rate of increase in the number of looms in each five-year period was a little lower than that in the number of spindles. The greatest increase for the decade in any geographic division was 96,879, or 101.3 per cent, in the South Atlantic division. The New England division shows an increase of 74,675, or 25 per cent, the Middle Atlantic a slight decrease, and the East South Central an increase of 11,343, or 75.6 per cent.

Of the several classes of looms employed on the different widths of plain cloth, the one showing the greatest percentage of gain is that comprising looms over 36 inches wide, which increased 59 per cent in number during the decade 1899-1909, as compared with an increase of only 39.2 per cent in the total number of looms used on plain cloth. This means that the capacity of the looms employed on plain cloth increased more rapidly than their total number.

The number of looms on twills and sateens increased 19,453, or 33.1 per cent, most of this gain having been in the New England states. An actual loss was reported by the Middle Atlantic division. The number of looms on fancy weaves increased 29,204, or 63.9 per

cent. The largest absolute gain in number of looms reported was in the New England states, but the relative increase in these states was less than that in the South Atlantic division, which amounted to 256.9 per cent.

DIVISION.	Census.	LOOMS IN COTTON MILLS. ¹									
		Aggregate.	On plain cloths.					On twills and sateens.	On fancy weaves.	On tapes and other narrow goods.	On bagging and other special fabrics.
			Total.	Less than 28 inches wide.	28 to 31 inches wide, inclusive.	32 to 36 inches wide, inclusive.	Over 36 inches wide.				
United States.....	² 1909	832, 983	473, 373	40, 934	128, 643	102, 401	200, 495	78, 292	74, 890	1, 332	5, 076
	1904	640, 910	402, 747	31, 901	115, 068	94, 649	160, 231	68, 038	62, 214	1, 439	6, 472
	1899	450, 682	340, 027	36, 601	98, 395	79, 349	126, 082	68, 839	45, 688	1, 709	4, 421
New England.....	² 1909	373, 560	255, 792	18, 557	75, 875	47, 261	113, 099	63, 940	60, 699	381	2, 748
	1904	324, 058	223, 291	11, 228	81, 742	40, 343	89, 978	55, 093	41, 443	711	3, 520
	1899	298, 885	216, 729	16, 765	77, 326	37, 722	84, 916	47, 080	31, 635	1, 588	1, 855
Middle Atlantic.....	² 1909	30, 805	19, 494	4, 907	1, 946	1, 913	10, 728	1, 659	8, 392	270	1, 090
	1904	28, 784	16, 051	5, 381	492	2, 150	8, 028	1, 915	9, 494	64	1, 260
	1899	32, 586	18, 297	6, 160	2, 499	2, 733	6, 905	3, 366	9, 287	84	1, 552
East North Central.....	² 1909	4, 399	3, 686	.....	350	2, 784	552	152	55	500	6
	1904	4, 696	4, 277	430	55	2, 709	1, 083	19	394	6	6
	1899	3, 461	3, 296	.....	523	2, 571	.....	.....	.....	165	.....
South Atlantic.....	² 1909	192, 580	166, 818	15, 956	44, 233	39, 783	66, 846	9, 330	15, 131	181	1, 100
	1904	155, 559	134, 158	13, 763	26, 195	40, 334	53, 866	9, 700	9, 923	270	1, 508
	1899	95, 681	84, 098	12, 268	14, 059	27, 516	30, 255	6, 817	4, 240	39	487
East South Central.....	² 1909	26, 342	22, 442	1, 454	5, 343	8, 769	6, 876	3, 221	609	.....	70
	1904	23, 431	21, 176	1, 097	6, 922	7, 397	5, 760	1, 280	901	.....	74
	1899	14, 999	13, 336	388	3, 568	6, 457	2, 923	1, 132	360	.....	171
West South Central.....	² 1909	4, 501	4, 345	60	676	1, 503	2, 106	90	4	.....	62
	1904	3, 726	3, 288	.....	560	1, 466	1, 262	50	384	.....	4
	1899	1, 018	702	.....	498	204	.....	244	.....	.....	72
All other states ²	² 1909	796	796	.....	120	388	288	.....	.....	.....	.....
	1904	656	506	2	.....	250	254	.....	50	.....	100
	1899	4, 052	3, 669	20	522	2, 146	881	200	164	.....	119

¹ Not including mills in the cotton small wares branch of the industry.

² In addition, establishments engaged primarily in the manufacture of products other than cotton goods reported cotton looms as follows:

Total number.....	540
On plain cloths.....	85
28 to 32 inches wide.....	19
36 inches wide and over.....	66
On twills and sateens.....	40
On fancy weaves.....	415

³ Includes the following states, with establishments as indicated: For 1909, Kansas, 1, and Missouri, 2; for 1904, California, 1, and Missouri, 1; for 1899, Arkansas, 2; California, 1; Colorado, 1; Illinois, 1; Louisiana, 2; Missouri, 2; Nebraska, 1; and West Virginia, 1.

Relation of spindles and looms to wage earners and cotton consumption.—Table 33 shows the average number of wage earners in cotton mills (including the mills in the cotton small wares branch of the industry), the amount of wages paid, the total number of active producing spindles, the number of such spindles per wage earner, and the amount of wages paid per spindle, for each census year from 1879 to 1909.

YEAR.	COTTON GOODS, INCLUDING COTTON SMALL WARES.				
	Wage earners (average number).	Wages.	Number of active producing spindles.	Number of spindles per wage earner.	Wages per spindle.
1909.....	378, 880	\$132, 859, 145	27, 425, 608	72.39	\$4.84
1904.....	315, 874	96, 205, 790	23, 195, 143	75.43	4.15
1899.....	302, 381	86, 689, 752	19, 050, 952	62.90	4.58
1889.....	218, 876	68, 024, 538	14, 188, 103	64.82	4.65
1879.....	172, 544	42, 040, 510	10, 653, 436	61.74	3.95

While there is little necessary relation between the number of spindles in a single establishment, or even in a single state or division, and the number of wage earners employed, by reason of variations in the character of the products turned out, the grade of

labor employed, and other factors which would affect either the proportion of spinners in the total number of wage earners or the nominal efficiency of the labor, the average number of spindles per wage earner for the United States as a whole is not without significance. It shows the relation, at least, between two statistical elements which are widely used as standards for measuring the growth of industries; and the industry as a whole is not subject to the rapid and radical changes which sometimes affect the mills of a limited section. Temporary labor troubles in New England in 1904 somewhat reduced the average number of wage earners without making any corresponding reduction in the number of spindles reported, thus rendering the average number of spindles per wage earner for that year somewhat higher than it would otherwise have been; but this case is exceptional. Increasing rates of wages must be taken into account, of course, in considering the wage cost per spindle, and also the fact that salaries were to some extent included with wages at the earlier censuses.

Of somewhat more significance, perhaps, than the figures given in the preceding table, are statistics

showing the average number of spindles per spinner and the average number of looms per weaver. Such statistics are presented in Table 34.

STATE.	COTTON GOODS, INCLUDING COTTON SMALL WARES.	
	Average number of spindles per spinner.	Average number of looms per weaver.
United States:		
1909.....	407	6.5
1904.....	384	5.6
Leading states, 1909:		
New England—		
Massachusetts.....	718	6.9
New Hampshire.....	553	8.8
Rhode Island.....	582	7.6
Southern—		
Alabama.....	245	5.7
Georgia.....	219	5.8
North Carolina.....	228	5.4
South Carolina.....	297	7.5

The several states differ greatly in the number of spindles per spinner, the figures for the Southern states being very much lower than those for the New England states. These differences are doubtless mainly attributable to differences in the efficiency of labor, to the fact that relatively more children are employed as spinners in the South than in the North, and to differences in the grade of yarn made. The difference between the South and the North with respect to the number of looms per weaver is less conspicuous; in fact, the average number of looms per weaver was higher in South Carolina than in Massachusetts.

Table 35 shows the amount of cotton used per spindle in the United States during each census year from 1879 to 1909, and in the leading states during 1909.

STATE.	Cotton consumed per spindle in the cotton manufacturing industry (pounds).
United States:	
1909.....	85.15
1904.....	80.90
1899.....	95.41
1889.....	78.79
1879.....	70.43
Leading states, 1909:	
New England—	
Massachusetts.....	66.39
New Hampshire.....	105.03
Rhode Island.....	47.70
Southern—	
Alabama.....	131.22
Georgia.....	143.37
North Carolina.....	120.41
South Carolina.....	86.40

The consumption of cotton per spindle in the country as a whole was considerably greater in 1909 than in 1879, though much less than in 1899. The changes are doubtless due in large measure to the increasing importance of the Southern states in cotton manufacturing and to changing conditions in the South. The consumption of cotton per spindle was lower in the New England states than in the Southern states, which is partly attributable to differences in the grade of yarn made.

Dyeing and finishing and contract work.—Table 36 shows, by states, the number of establishments bleaching, dyeing, or printing their own products in 1909, the number performing these processes for others, and the number doing custom spinning or weaving.

STATE.	ESTABLISHMENTS IN THE COTTON MANUFACTURING INDUSTRY: 1909			
	Total number.	Bleaching, dyeing, or printing—		Doing custom spinning or weav- ing.
		Their own goods.	For others.	
United States.....	1,324	315	27	19
Alabama.....	51	4		
Connecticut.....	52	14	1	1
Georgia.....	116	31		
Illinois.....	5	3	1	
Indiana.....	7	2		
Kentucky.....	4	2		
Maine.....	16	3		
Maryland.....	16	2		
Massachusetts.....	182	48	9	4
Mississippi.....	14	5		
New Hampshire.....	21	9	2	
New Jersey.....	26	8	2	
New York.....	47	21	3	
North Carolina.....	281	70	3	
Ohio.....	4	1		
Pennsylvania.....	175	49	3	8
Rhode Island.....	106	19	3	5
South Carolina.....	147	19		
Virginia.....	10	2		
All other states.....	44	3		1

Of the 1,324 establishments in the cotton manufacturing industry in 1909, 315 reported that they bleached, dyed, or printed their own goods, 27 that they performed these processes for others as well as upon their own products, and 19 that they did custom spinning or weaving. Of the other establishments, some made only products requiring no bleaching, dyeing, or printing, while others had the work done under contract, either by other establishments in the industry or by establishments in other industries, particularly in the industry designated "dyeing and finishing textiles."

The total expenditure of the cotton mills for contract work of all kinds in 1909 was \$2,157,069. This expenditure is distributed, by states, in Table 46.

SPECIAL STATISTICS FOR THE COTTON SMALL WARES BRANCH OF THE INDUSTRY.

Table 37 summarizes the statistics of the cotton small wares branch of the industry for 1909, 1904, and 1899.

	COTTON SMALL WARES BRANCH OF THE INDUSTRY.					
	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments.	116	77	82	41.5	50.6	-6.1
Persons engaged in the industry.	8,233	5,724	6,206	58.1	43.8	10.0
Proprietors and firm members.	74	65	85	-12.9	13.8	-23.5
Salaried employees.	461	243	189	143.9	89.7	28.6
Wage earners (average number).	7,698	5,416	4,932	56.1	42.1	9.8
Primary horsepower.	10,412	7,495	5,976	74.2	38.9	25.4
Capital.	\$13,824,772	\$8,010,491	\$6,397,385	116.1	72.6	25.2
Expenses.	11,768,684	6,918,456	5,362,738	119.5	70.1	29.0
Services.	3,765,968	2,154,224	1,790,067	110.4	74.8	20.3
Salaries.	696,540	326,124	226,625	207.4	113.6	43.9
Wages.	3,069,428	1,828,100	1,563,442	96.3	67.9	16.9
Materials.	6,995,966	4,207,655	3,110,137	124.9	66.3	35.3
Miscellaneous.	1,006,750	556,577	462,534	117.7	80.9	20.3
Value of products.	13,174,111	8,016,486	6,394,164	106.0	64.3	25.4
Value added by manufacture (value of products less cost of materials).	6,178,145	3,808,831	3,284,027	88.1	62.2	16.0

¹ A minus sign (-) denotes decrease.

A considerable number of establishments which use cotton or cotton yarn as their chief material do not

make piece goods, but confine their operations mainly to the manufacture of narrow fabrics, such as braids, tapes, binding, shoe laces, and corset laces, incidentally spinning small quantities of yarn for sale.

These establishments constitute the cotton small wares branch of the cotton manufacturing industry. Except as otherwise noted, the data relating to these establishments have been included with those for the other cotton mills in the statistics heretofore presented, but they are shown separately for 1909, 1904, and 1899 in Table 37. It should be borne in mind that large quantities of cotton small wares are also manufactured by establishments making piece goods as well.

From 1899 to 1904 the number of establishments in the cotton small wares branch of the industry decreased from 82 to 77, but in 1909 these establishments numbered 116. The average number of wage earners increased 56.1 per cent during the decade, and the value of products increased 106 per cent during the same period.

Summary, by states.—Table 38 summarizes, by states, the important statistics relating to the cotton small wares branch of the cotton manufacturing industry for 1909, 1904, and 1899.

COTTON SMALL WARES—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
			Expressed in thousands.										
United States	1909	116	8,233	74	461	7,698	10,412	\$13,825	\$697	\$3,069	\$6,996	\$13,174	\$6,178
	1904	77	5,724	65	243	5,416	7,495	8,010	326	1,328	4,208	8,016	3,808
	1899	82	5,206	85	189	4,932	5,976	6,397	227	1,563	3,110	6,394	3,284
Connecticut	1909	4	84	4	9	71	74	98	9	25	29	89	60
	1904	3	53	1	8	44	339	70	12	16	133	186	53
	1899												
Massachusetts	1909	24	988	20	70	896	1,626	1,391	94	365	989	1,711	722
	1904	19	668	13	48	607	1,177	833	55	203	501	898	397
	1899	14	465	11	24	430	800	528	32	151	321	647	326
New Jersey	1909	8	164	6	16	142	299	440	16	54	122	272	150
	1904												
	1899	5	180	1	16	163	264	410	19	44	231	390	159
New York	1909	9	342	12	26	304	288	556	47	134	304	603	399
	1904	3	236	1	24	211	350	648	33	71	242	418	174
	1899	18	664	22	42	600	290	551	36	163	461	840	379
Pennsylvania	1909	33	2,477	24	148	2,305	1,775	4,105	222	818	2,406	4,232	1,826
	1904	21	1,565	27	94	1,474	1,041	2,169	85	488	1,110	2,163	1,053
	1899	24	1,528	34	50	1,444	969	1,948	65	455	938	2,026	1,088
Rhode Island	1909	29	3,567	8	138	3,421	5,307	6,306	221	1,456	2,578	5,191	2,613
	1904	26	2,939	13	85	2,841	4,082	3,950	130	1,000	1,996	3,945	1,949
	1899	16	2,270	13	48	2,209	3,313	2,877	68	738	1,096	2,380	1,284
All other states	1909	9	613		54	659	1,043	929	88	217	568	1,076	508
	1904	5	263		14	239	506	390	11	50	226	408	182
	1899	5	99	4	9	86	340	85	7	14	63	111	48

¹ Included under "all other states."

In 1909 the largest number of establishments was reported for Pennsylvania, with Rhode Island ranking next, but in value of products the latter state ranked first. Three states show a very considerable increase in value of products between 1899 and 1909, namely,

Massachusetts (164.5 per cent), Rhode Island (118.1 per cent), and Pennsylvania (108.9 per cent).

Materials.—Table 39 shows statistics of the materials used by establishments in the cotton small wares branch of the industry for 1909, 1904, and 1899.

MATERIAL.	MATERIALS USED IN THE COTTON SMALL WARES BRANCH OF THE INDUSTRY.		
	1909	1904	1899
Total cost.....	\$6,995,966	\$4,207,655	\$3,110,137
Cotton:			
Domestic—			
Bales.....	6,331	6,676	7,213
Pounds.....	3,082,270	3,362,434	3,640,873
Cost.....	\$359,106	\$390,805	\$264,541
Yarns:			
Cotton—			
Pounds.....	18,346,525	13,816,853	10,860,648
Cost.....	\$4,700,513	\$3,009,717	\$1,873,032
Silk—			
Pounds.....	100,662	23,924	43,709
Cost.....	\$350,834	\$98,617	\$134,296
Spun silk—			
Pounds.....	37,617	19,090	9,852
Cost.....	\$112,912	\$53,624	\$25,394
Other yarns—			
Pounds.....	480,013	389,143	1,040,103
Cost.....	\$252,385	\$66,975	\$264,331
Waste:			
Pounds.....	625,526	156,000	399,500
Cost.....	\$59,138	\$12,480	\$2,310
Starch.....	\$18,681	\$15,565	\$3,908
Chemicals and dyestuffs.....	\$77,337	\$36,032	\$46,339
All other materials.....	\$1,065,060	\$518,840	\$495,986

The total cost of materials used increased from \$3,110,137 in 1899 to \$4,207,655 in 1904 and to \$6,995,966 in 1909, an increase of 124.9 per cent for the decade. The most important of the materials is cotton yarn purchased as such, the consumption of which increased from 10,860,648 pounds in 1899 to 18,346,525 pounds in 1909, or 68.9 per cent. During the same period the cost increased 151 per cent, forming 60.2 per cent of the total cost of materials in 1899 and 67.2 per cent in 1909. The consumption of silk yarn and spun silk yarn also increased greatly from 1899 to 1909, but the quantity of raw cotton used shows a steady decrease for the decade.

Products.—Table 40 gives, so far as possible without the disclosure of individual operations, the quantity and value of the principal products of the cotton small wares branch of the cotton manufacturing industry for 1909, 1904, and 1899. It shows also the total quantity of yarn spun (including that used in further processes of manufacture), classified according to degree of fineness.

PRODUCT.	PRODUCTS OF THE COTTON SMALL WARES BRANCH OF THE INDUSTRY.		
	1909	1904	1899
Total value.....	\$13,174,111	\$8,016,486	\$6,394,164
Tape and webbing.....	\$5,338,468	\$4,010,942	\$2,192,601
Yarns for sale:			
Pounds.....	150,428	162,000	116,609
Value.....	\$96,279	\$54,300	\$27,403
Waste for sale:			
Pounds.....	643,791	314,538	761,857
Value.....	\$15,306	\$13,020	\$11,336
Other cotton products.....	\$7,661,037	\$3,637,316	\$2,901,186
All other products.....	\$63,021	\$300,908	\$1,261,638
Yarn produced ² pounds..	2,637,021	2,410,268	(1)
No. 20 and under (coarse).....	1,127,514	344,135	(1)
No. 21 to No. 40 (medium).....	1,432,464	2,066,133	(1)
No. 41 to No. 60 (fine).....	77,043	.....	(1)

¹ Not reported. ² Including that used in the further processes of manufacture.

The value of tape and webbing constituted 40.5 per cent of the total value of products in 1909 and 34.3 per cent in 1899. The total quantity of yarn spun increased from 2,410,268 pounds in 1904 to 2,637,021 pounds in 1909, or 9.4 per cent, the quantity of coarse yarn made in 1909 being more than three times as great as in 1904, while the quantity of medium yarn decreased 30.7 per cent. No fine yarn was reported for 1904 and only a small quantity for 1909.

Spindles and looms.—Table 41 shows the number of spindles and of looms (including braiders) employed in the cotton small wares branch of the cotton manufacturing industry in 1909, 1904, and 1899, for the United States and for selected states.

STATE.	Census.	COTTON SMALL WARES BRANCH OF THE INDUSTRY.	
		Spindles.	Looms (including braiders).
United States.....	1909	29,808	32,086
	1904	39,630	18,338
	1899	42,600	5,070
Massachusetts.....	1909	2,640	5,501
	1904	.....	5,506
	1899	.....	302
Pennsylvania.....	1909	112	5,275
	1904	250	3,167
	1899	.....	1,684
Rhode Island.....	1909	25,000	18,492
	1904	36,230	8,288
	1899	39,900	2,826
All other states.....	1909	2,056	2,818
	1904	3,000	1,425
	1899	2,700	258

The total number of spindles in 1909 was 29,808, as compared with 42,600 in 1899, a decrease of 30 per cent during the decade. Rhode Island reported 25,000 spindles in 1909, or 83.9 per cent of the total. The exceedingly small number of spindles reported by Pennsylvania is worthy of note, as indicating the use of purchased yarns in most of the cotton small wares mills of that state. While there was a considerable decrease during the decade in the total number of spindles reported, a great gain is shown in the number of looms and braiders, which was 32,086 in 1909; of this number, 26,382 were braiders. Of the total number of looms and braiders reported for 1909, 57.6 per cent were in Rhode Island. Of the 26,382 braiders in 1909, Rhode Island reported 16,871, Massachusetts 4,905, Pennsylvania 2,130, and all other states 2,476.

The spinning of the yarn has apparently become less and less a factor in this branch of the industry, the manufacturers preferring to buy the yarn of other establishments.

IMPORTS AND EXPORTS OF COTTON AND COTTON GOODS.

Table 42 shows, for each census year from 1850 to 1900, and for each year from 1905 to 1909, the production, net imports, consumption, and exports of raw cotton.

YEAR.	QUANTITY (EQUIVALENT 500-POUND BALES).				YEAR.	QUANTITY (EQUIVALENT 500-POUND BALES).			
	Production. ¹	Net imports. ²	Consumption. ²	Exports. ²		Production. ¹	Net imports. ²	Consumption. ²	Exports. ²
1909.....	13,587,306	165,451	5,198,963	8,889,724	1900.....	9,459,935	134,778	3,687,253	6,167,623
1908.....	11,375,461	140,869	4,493,028	7,779,508	1890.....	7,472,511	18,334	2,518,409	4,928,921
1907.....	13,595,498	202,733	4,974,199	8,825,236	1880.....	5,466,387	7,578	1,500,688	3,742,752
1906.....	10,804,556	133,464	4,877,465	6,975,494	1870.....	2,409,597	3,026	796,616	1,987,708
1905.....	13,679,954	130,182	4,523,208	9,057,397	1860.....	4,309,642	.....	845,410	3,535,373
					1850.....	1,975,274	485	575,506	1,270,783

¹ Figures represent the crop grown in the preceding year.

² Statistics relate to year ending August 31.

Table 43 shows, for selected years, the imports of cotton manufactures, while Table 44 presents statistics of exports of cotton manufactures corresponding to the statistics of imports given in Table 43.

YEAR ENDING JUNE 30—	IMPORTS OF COTTON MANUFACTURES, NOT INCLUDING WEARING APPAREL OR KNIT GOODS: 1869-1909								
	Total value.	Cloths.				Embroideries, lace, insertion, trimmings, lace curtains, cords, and gimps (value).	Thread (not on spools), yarns, warps, and warp yarn.		All other manufactures (value).
		Not bleached, dyed, colored, stained, painted, or printed.		Bleached, dyed, colored, stained, painted, or printed.			Quantity (pounds).	Value.	
		Quantity (square yards).	Value.	Quantity (square yards).	Value.				
1909.....	\$51,949,866	2,535,251	\$289,843	65,841,357	\$9,900,294	\$34,368,580	6,926,295	\$3,306,172	\$4,084,977
1908.....	54,126,327	3,609,409	344,941	75,876,055	12,079,919	35,611,010	7,036,442	3,921,111	4,169,346
1907.....	60,297,885	2,406,910	280,298	80,235,421	12,727,769	39,756,502	6,940,261	3,583,627	3,949,689
1906.....	52,909,043	1,878,528	216,711	72,778,701	11,719,880	34,022,469	5,111,644	2,598,724	4,351,259
1905.....	40,388,794	1,309,358	155,695	46,210,012	7,794,179	25,911,684	5,025,331	2,204,154	4,323,082
1904.....	40,974,520	1,415,512	159,102	50,032,691	8,144,383	24,848,764	5,060,533	2,261,924	5,560,347
1903.....	44,057,108	1,322,007	156,545	59,998,185	9,013,092	25,110,081	5,764,937	2,421,729	7,355,661
1902.....	37,440,098	772,011	86,386	45,440,314	6,934,393	22,449,314	5,006,190	1,921,748	6,048,257
1901.....	33,254,762	1,612,267	196,949	39,150,780	5,828,653	20,235,299	3,725,256	1,746,723	5,147,138
1900.....	35,349,246	3,061,790	357,604	61,986,063	8,156,301	19,206,165	5,272,491	2,098,958	5,528,218
1899.....	26,691,859	1,250,932	107,023	51,196,236	6,649,014	14,550,015	2,325,974	849,819	4,535,988
1889.....	20,033,005	2,577,230	203,100	27,808,959	3,696,194	9,591,943	1,744,652	860,703	5,681,065
1879.....	14,930,975	1,673,083	1789,359	5,195,126	707,064	.....	.....	.....	13,434,532
1869.....	16,474,036	1,268,603	1,353,132	21,480,786	2,960,918	.....	.....	.....	9,979,986

¹ Includes bleached goods.

² Includes jeans, denims, and drillings to the value of \$141,066.

³ Includes jeans, denims, and drillings to the value of \$991,051.

YEAR ENDING JUNE 30—	EXPORTS OF DOMESTIC MANUFACTURES OF COTTON, NOT INCLUDING WEARING APPAREL OR KNIT GOODS: 1869-1909						
	Total value.	Cloths.				Yarn (value).	All other manufactures (value).
		Uncolored.		Dyed, colored, or printed.			
		Quantity (square yards).	Value.	Quantity (square yards).	Value.		
1909.....	\$27,631,899	246,123,197	\$14,527,501	121,508,346	\$7,165,579	\$551,062	\$5,387,757
1908.....	20,476,279	126,729,841	8,459,064	80,264,971	5,809,019	400,600	6,807,696
1907.....	27,511,186	206,054,287	13,737,165	120,286,042	7,502,082	328,638	6,943,301
1906.....	48,605,458	594,517,108	36,252,553	116,975,946	6,929,307	365,452	5,058,146
1905.....	46,188,428	566,684,218	33,995,134	127,916,497	7,325,408	310,237	4,557,649
1904.....	19,703,293	156,060,758	9,266,922	91,319,979	5,439,277	172,286	4,834,808
1903.....	29,616,168	325,867,530	16,909,436	169,511,667	8,443,148	(1)	4,263,584
1902.....	30,017,770	358,004,621	18,501,908	146,769,292	7,359,288	(1)	4,156,574
1901.....	18,617,882	135,554,132	7,581,812	115,949,219	6,554,225	(1)	4,481,845
1900.....	22,400,479	264,314,474	13,229,443	87,880,515	4,839,491	(1)	4,331,545
1899.....	22,291,075	303,063,083	13,748,619	108,940,972	5,221,278	(1)	3,321,178
1889.....	9,910,841	77,596,862	5,577,401	40,856,329	2,885,373	(1)	1,448,067
1879.....	10,853,950	84,081,319	6,288,131	45,116,058	3,209,285	(1)	1,356,534
1869.....	5,874,222	(2)	(2)	(2)	(2)	(3)	(4)

¹ Included under "all other manufactures."

² Not reported separately.

DETAILED STATE TABLES.

The principal statistics secured concerning the cotton manufacturing industry as a whole are presented, by states, in Tables 45 and 46.

Table 45 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 46 gives more detailed statistics for the industry for 1909 only.

HOSIERY AND KNIT GOODS

THE HOSIERY AND KNIT GOODS INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—The classification "hosiery and knit goods" covers all establishments engaged primarily in the manufacture of knit goods, irrespective of the kind of materials used. Formerly a distinction was made between those employing power in the operation of the knitting machines and those using hand machines, the statistics for the latter class of establishments being presented under the designation "hand knit goods." The distinction between the two classes of establishments, however, has lost most of its significance because the use of power-driven machines has become almost universal, and the present report covers both classes of establishments. In 1909, 110 establishments were reported as using hand machines, these establishments manufacturing products valued at \$1,571,939, giving employment to an average of 567 wage earners, and paying out \$213,568 in wages and \$824,991 for materials. The rela-

tively small importance of this class of establishments is indicated by the fact that they formed only 8 per cent of the total number of establishments in the industry in the United States, employed only four-tenths of 1 per cent of the total number of wage earners, and reported only eight-tenths of 1 per cent of the total value of products.

Comparison with earlier censuses.—Statistics for the hosiery and knit goods industry were first obtained at the census of 1849, when 85 establishments were reported, with products valued at \$1,028,102. In 1859, 197 establishments were reported, with products valued at \$7,280,606. Table 1 summarizes the statistics of the industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 1

	HOSIERY AND KNIT GOODS INDUSTRY.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	1,374	1,144	1,006	824	398	248	36.6	20.1	13.7	22.1	107.0	60.5
Persons engaged in the industry.....	136,130	109,489	(²)	(²)	(²)	(²)	24.3	24.3	.....	.....	.....	.....
Proprietors and firm members.....	1,134	1,067	(²)	(²)	(²)	(²)	6.3	6.3	.....	.....	.....	.....
Salaries.....	5,721	4,330	2,831	(²)	(²)	(²)	102.1	32.1	52.9	.....	.....	.....
Wage earners (average number).....	129,275	104,092	83,691	59,774	30,699	14,788	54.5	24.4	24.4	(²)	(²)	(²)
Primary horsepower.....	103,709	78,769	67,346	34,564	11,561	6,498	80.8	31.7	37.4	65.9	199.0	77.9
Capital.....	\$163,641,171	\$106,943,072	\$82,065,517	\$50,686,206	\$15,732,291	\$10,931,260	99.4	53.0	30.3	61.9	222.2	43.9
Expenses.....	175,729,583	123,276,675	85,395,367	57,922,723	(²)	(²)	105.8	42.5	44.4	47.4	.....	.....
Services.....	52,431,680	36,069,758	27,572,657	18,325,261	6,839,195	4,429,085	90.2	45.4	30.8	50.5	167.9	54.4
Salaries.....	7,691,457	4,455,151	3,138,160	(²)	(²)	(²)	146.1	72.6	42.0	.....	.....	.....
Wages.....	44,740,223	31,614,607	24,434,497	(²)	(²)	(²)	83.1	41.5	29.4	.....	.....	.....
Materials.....	110,241,053	76,789,348	51,195,330	35,949,865	15,449,991	9,835,823	115.3	43.6	50.0	42.4	132.7	57.1
Miscellaneous.....	13,056,850	10,417,569	6,627,380	3,647,597	(²)	(²)	97.0	25.3	57.2	81.7	.....	.....
Value of products.....	200,143,527	137,076,454	95,833,692	67,446,788	29,613,581	18,411,564	108.8	46.0	43.0	42.1	127.8	60.8
Value added by manufacture (value of products less cost of materials).....	89,902,474	60,287,106	44,638,362	31,496,923	14,163,590	8,575,741	101.4	49.1	35.1	41.7	122.4	65.2

¹ Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

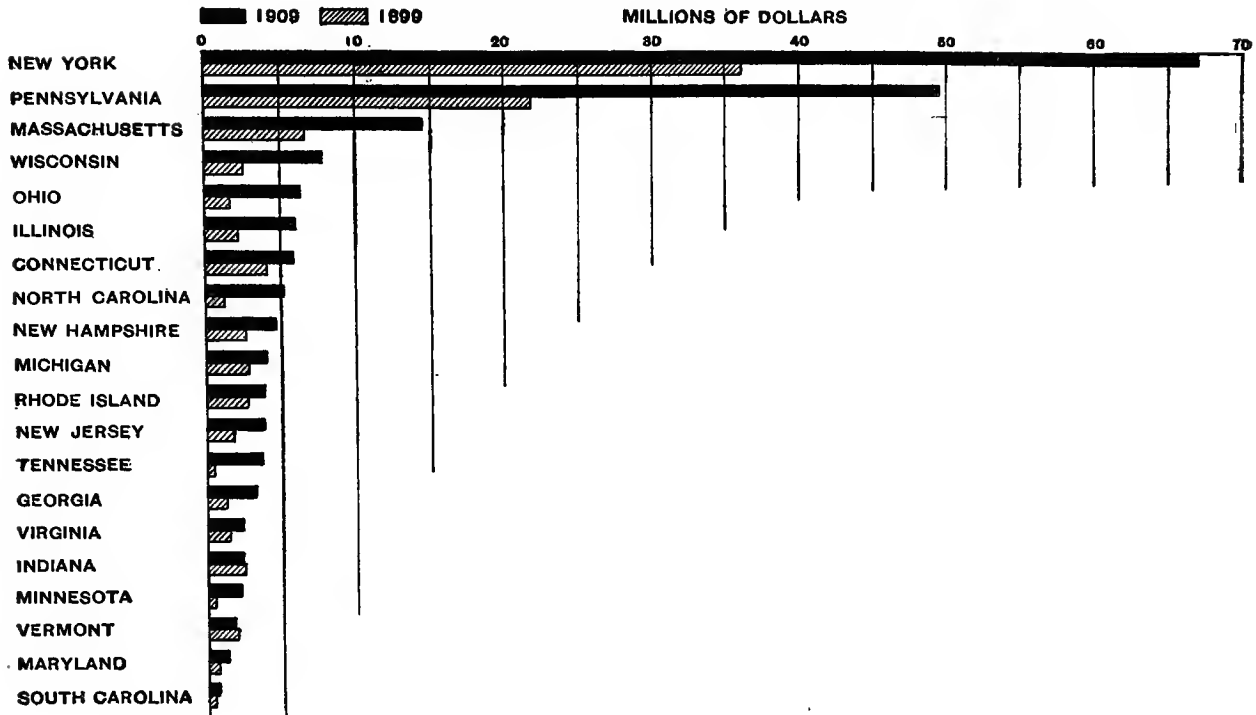
³ Figures not strictly comparable.

There were in 1909, 1,374 establishments in the hosiery and knit goods industry, in which 136,130 persons were engaged, of whom 129,275 were wage earners. The amount paid in salaries and wages was \$52,431,680. The value of products was \$200,143,527; the cost of materials, \$110,241,053, equal to 55.1 per cent of the value of products; and the value added by manufacture \$89,902,474. Between 1899 and 1909 the number of wage earners increased 54.5 per cent, while the cost of materials, value of products, and value added by manufacture more than doubled. At

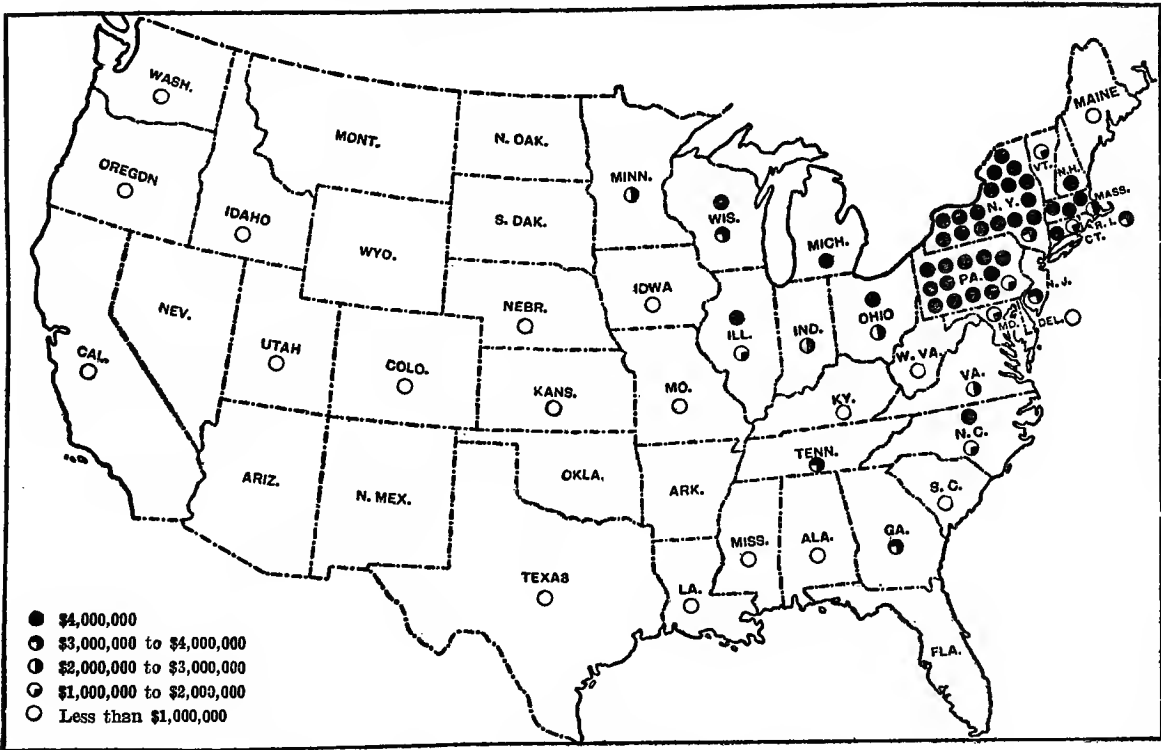
least part of the increase shown in cost of materials and value of products, however, is doubtless attributable to increased prices.

The growth of the industry has been continuous throughout the period covered by Table 1, each census showing substantial increases as compared with that preceding. The number of establishments reported for 1909 was more than five times as great as in 1869 and the value of products nearly eleven times as great. The greatest relative growth took place during the decade 1879-1889, each item for which comparable

VALUE OF PRODUCTS FOR THE MOST IMPORTANT STATES: 1909 AND 1899.



DISTRIBUTION OF THE VALUE OF PRODUCTS, BY STATES: 1909.



PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 3 shows for 1909 the number of persons engaged in the industry classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE HOSIERY AND KNIT GOODS INDUSTRY: 1909		
	Total.	Males.	Females.
All classes.....	136,130	43,950	92,180
Proprietors and officials.....	3,308	3,125	183
Proprietors and firm members.....	1,134	1,067	67
Salaried officers of corporations.....	799	751	18
Superintendants and managers.....	1,375	1,277	98
Clerks.....	3,547	2,398	1,149
Wage earners (average number).....	129,275	38,427	90,848
16 years of age and over.....	118,769	35,383	83,386
Under 16 years of age.....	10,506	3,044	7,462

The average number of persons engaged in the industry during 1909 was 136,130, of whom 129,275, or 95 per cent, were wage earners; 3,308, or 2.4 per cent, proprietors and officials; and 3,547, or 2.6 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 43,950, or 32.3 per cent, were males, and 92,180, or 67.7 per cent, females. Of the wage earners, 70.3 per cent were females. This is the highest percentage of female wage earners reported for any of the textile industries, the percentage in the silk manufacturing industry being 62.6; in the woolen industry 44.5; and in the cotton goods industry, 43.7. Children under 16 years of age constituted 8.1 per cent of the wage earners in the hosiery and knit goods industry, as compared with 8 per cent in the silk manufacturing industry, 5.7 per cent in the woolen industry, and 10.4 per cent in the cotton goods industry.

The average number of wage earners employed in each state in 1909, 1904, and 1899 is given in Table 30. The distribution of the average number by sex and age is not shown for the individual states, but Table 31 gives such a distribution of the number employed on December 15, or the nearest representative day. The largest number of female wage earners 16 years of age and over (28,045) was employed in Pennsylvania, and the next largest number (24,424) in New York. The largest number of wage earners under 16 years of age (4,515) was also reported from Pennsylvania, but the next largest (1,501) was in North Carolina.

Of the states in which more than 2,000 wage earners were employed in the hosiery and knit goods industry in 1909, Ohio reported the highest proportion of

this class the percentages were as follows: Michigan, 76.4; Wisconsin, 71.7; Pennsylvania, 69.5; New Hampshire, 66.7; Connecticut, 66.1; New York, 63.6; Illinois, 63.3; New Jersey, 58; Tennessee, 57.6; Georgia, 55.1; Indiana, 54.4; Massachusetts, 53.9; and North Carolina, 49.7.

The proportion of children under 16 years of age was higher in North Carolina (27.7 per cent) than in any other state employing 2,000 or more wage earners in this industry. In the other states of this class the percentages were as follows: Indiana, 19.3; Tennessee, 16.6; Georgia, 16.1; Pennsylvania, 11.2; Wisconsin, 10.6; Ohio, 7; Illinois, 6.8; New Jersey, 4.9; Massachusetts, 4.4; Connecticut, 3.1; Michigan, 2.7; New Hampshire, 1.9; and New York, 1.8.

In order to compare the distribution of the persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE HOSIERY AND KNIT GOODS INDUSTRY.				Per cent of in- crease: 1904- 1909
	1909		1904		
	Number.	Per cent distrib- ution.	Number.	Per cent distrib- ution.	
Total.....	136,130	100.0	109,489	100.0	24.3
Proprietors and firm members.....	1,134	0.8	1,067	1.0	6.3
Salaried employees.....	5,721	4.2	4,330	4.0	32.1
Wage earners (average number).....	129,275	95.0	104,092	95.1	24.2

Salaried employees show the highest percentage of increase for the five-year period and proprietors and firm members the lowest.

Table 5 shows the average number of wage earners in the industry, distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE HOSIERY AND KNIT GOODS INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distrib- ution.	Number.	Per cent distrib- ution.	Number.	Per cent distrib- ution.
Total.....	129,275	100.0	104,092	100.0	83,691	100.0
16 years of age and over.....	118,769	91.9	94,405	90.7	75,022	89.6
Male.....	35,383	27.4	25,212	24.2	21,197	25.3
Female.....	83,386	64.5	69,193	66.5	53,825	64.3
Under 16 years of age.....	10,506	8.1	9,687	9.3	8,669	10.4

Although the actual number of children reported as employed in the hosiery and knit goods industry has shown an increase at each succeeding census, the percentage which they have formed of the total number of wage earners has decreased. The percentage of females 16 years of age and over was approximately

Wage earners classified according to nature of employment.—Table 6 gives for the United States the number of wage earners employed as spinners, knitters, and finishers, respectively, in 1909 and 1904, classified according to age and sex, with similar statistics for New York and Pennsylvania for 1909 only. It should be noted that the absolute figures for the two censuses are not strictly comparable, owing to the fact that the numbers shown for 1904 are computed averages for the entire year, while those for 1909 are the numbers reported for December 15, or the nearest representative day. The difference between the number of wage earners on this day and the average number for the year 1909, however, was only 7,438, or about 5 per cent of the total; and since there is little variation from month to month in the proportion of the different classes of employees, the figures representing the per cent distribution may be taken as fairly comparable.

In 1909, of the 136,713 wage earners employed on December 15, or the nearest representative day, 2.3 per cent were employed as spinners, 26.5 per cent as knitters, and 39.4 per cent as finishers. In Pennsylvania, where, as shown by Table 21, hosiery constitutes the chief product of the industry, the distribution of the wage earners, according to occupation, is very different from that in New York, where the products are largely shirts and drawers, sweaters, cardigan jackets, etc.

Among the knitters and finishers women 16 years of age and over predominate, constituting, in 1909, 63.5 per cent of all knitters and 81.1 per cent of all finishers, but of the spinners men formed 66.3 per cent. The proportion of children under 16 years of age among spinners was 6.9 per cent, among knitters 8.9 per cent, among finishers 5.9 per cent, and among all other wage earners 10.3 per cent.

CLASS.	WAGE EARNERS IN THE HOSIERY AND KNIT GOODS INDUSTRY. ¹					CLASS.	WAGE EARNERS IN THE HOSIERY AND KNIT GOODS INDUSTRY.							
	Total.	16 years of age and over.		Under 16 years of age.			Total.	16 years of age and over.		Under 16 years of age.				
		Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.			
Total:														
1909.....	136,713	37,419	88,183	3,219	7,892	New York, 1909:								
1904.....	103,715	25,167	68,887	9,681		Total.....	38,419	13,289	24,424	165	541			
Spinners:						Spinners.....	1,288	1,060	222	3	3			
1909.....	3,133	2,078	839	116	100	Knitters.....	4,087	2,800	1,246	9	32			
1904.....	2,909	2,011	662	236		Finishers.....	18,879	1,500	17,102	50	227			
Knitters:						All other.....	14,165	7,929	5,854	103	279			
1909.....	36,193	9,994	22,973	829	2,397	Per cent of total—								
1904.....	28,697	7,783	18,012	2,902		Spinners.....	3.4	8.0	0.9	1.8	0.6			
Finishers:						Knitters.....	10.6	21.1	5.1	5.5	5.9			
1909.....	53,818	6,991	43,627	857	2,343	Finishers.....	49.1	11.3	70.0	30.3	42.0			
1904.....	40,362	4,302	33,740	2,320		All other.....	36.9	59.7	24.0	62.4	51.6			
All other:						PENNSYLVANIA, 1909:								
1909.....	43,569	18,356	20,744	1,417	3,052	Total.....	40,326	7,766	28,045	1,124	3,391			
1904.....	31,747	11,071	16,453	4,223		Spinners.....	357	236	81	27	13			
Per cent of total:						Knitters.....	16,272	2,897	11,817	338	1,220			
Spinners:						Finishers.....	13,387	2,365	9,609	381	1,032			
1909.....	2.3	5.6	1.0	3.6	1.3	All other.....	10,310	2,268	6,538	378	1,126			
1904.....	2.8	8.0	1.0	2.4		Per cent of total—								
Knitters:						Spinners.....	0.9	3.0	0.3	2.4	0.4			
1909.....	26.5	26.7	26.1	25.8	30.4	Knitters.....	40.4	37.3	42.1	30.1	36.0			
1904.....	27.7	30.9	26.2	30.0		Finishers.....	33.2	30.5	34.3	33.9	30.4			
Finishers:						All other.....	25.6	29.2	23.3	38.6	33.2			
1909.....	39.4	18.7	49.5	26.6	29.7									
1904.....	38.9	17.1	49.0	24.0										
All other:														
1909.....	31.9	49.1	23.5	44.0	38.7									
1904.....	30.6	44.0	23.9	43.6										

¹ For 1909, the figures are those reported for December 15, or the nearest representative day; for 1904, the average number for the year is given.
² Not including the few operatives of this class in establishments using hand machines, for which figures are not available.

Wage earners employed, by months.—Table 7 gives the number of wage earners employed in the hosiery and knit goods industry on the 15th (or the nearest representative day) of each month during the year 1909 for 21 states in which an average of 500 or more wage earners were employed during the year.

The largest number of wage earners reported as employed in the hosiery and knit goods industry during any month of 1909 was 134,540, in November, and the smallest number, 123,308, in January, the minimum number being equal to 91.7 per cent of the maximum. This industry is not subject to any material changes from one part of the year to another, the statistics

for 1904 showing even less variation from month to month than those for 1909. The maximum number in 1904, 106,203, was reported for October and the minimum number, 101,212, which was equal to 95.3 per cent of the maximum, for January.

Table 7 shows further that in each of the three principal states in the industry—New York, Pennsylvania, and Massachusetts—the greatest activity in 1909 occurred during the fall and early winter. The months of maximum and minimum employment for 1909 and the number of wage earners reported for these months are given for a larger number of states in Table 31.

Of the total number of wage earners reported for the industry in 1909, as shown by Table 10, 12.7 per cent were employed in establishments under individual ownership, 15.2 per cent in those under firm ownership (including the one establishment under "other" owner-

ship), and 72.1 per cent in those owned by corporations. The table also gives statistics for the hosiery and knitting mills classified according to form of ownership for 21 states in which an average of more than 500 wage earners were employed in 1909.

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	443	280	651	16,453	19,648	93,174	\$24,852,520	\$33,269,175	\$142,021,832	\$10,468,747	\$14,657,708	\$64,775,021
Alabama.....			6			611			591,000			277,345
Connecticut.....	2		19	(X)		3,340	(X)		5,800,692	(X)		2,762,145
Georgia.....		1	21		(X)	2,743		(X)	3,232,623		(X)	1,900,487
Illinois.....	15	10	18	144	676	2,193	241,370	968,465	4,736,902	118,686	443,598	2,152,088
Indiana.....			5			1,933			2,381,219			1,466,586
Maryland.....	5	2	4	522	(X)	600	589,454	(X)	582,871	213,408	(X)	261,762
Massachusetts.....	20	7	38	215	1,001	8,725	474,926	2,549,024	11,712,075	190,521	1,130,605	6,443,293
Michigan.....	8	4	23	244	61	332,168	332,168	104,798	3,592,139	190,609	48,407	1,743,483
Minnesota.....	5	1	4	98	(X)	959	182,857		2,089,837	80,292	(X)	1,066,332
New Hampshire.....	3	4	14	12	691	2,426	26,460	1,143,838	3,593,821	13,373	581,630	1,533,443
New Jersey.....	14	9	14	339	304	1,863	622,759	498,455	2,801,027	227,411	226,185	1,530,767
New York.....	131	73	156	3,634	7,231	25,085	7,360,501	13,969,732	45,800,063	3,012,405	6,087,870	19,852,650
North Carolina.....	5	13	44	240	521	4,300	185,322	558,912	4,407,458	58,648	202,359	1,878,390
Ohio.....	8	8	23	236	493	2,420	369,992	1,046,149	5,017,290	201,979	411,163	1,968,870
Pennsylvania.....	185	130	149	9,363	7,714	21,129	12,160,619	10,952,157	26,544,730	5,059,341	4,868,638	12,511,576
Rhode Island.....	4	2	11	488	(X)	1,286	836,126	(X)	3,029,666	437,794	(X)	983,541
South Carolina.....	1	1	5	(X)	(X)	839	(X)	(X)	665,340	(X)	(X)	321,470
Tennessee.....	2		20	(X)		3,117	(X)		3,565,456	(X)		1,445,211
Vermont.....	1	2	5	(X)	223	723	(X)	479,850	1,265,820	(X)		438,548
Virginia.....	5	1	5	1,231	(X)	484	1,833,728	(X)	629,061	743,603		252,048
Wisconsin.....	22	3	36	97	19	4,166	119,081	61,709	7,662,599	56,949	26,684	3,872,500

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for establishments under firm ownership include those for one establishment under cooperative ownership.

There was little variation in the several states with respect to the relative importance of establishments operated under the different forms of ownership. In the majority of the states establishments owned by corporations constituted the most important class, as measured by number of wage earners employed and value of products, those owned by firms ranking second, and those under individual ownership third. In Pennsylvania, New Jersey, and Michigan, however, the number of wage earners and the value of products for establishments under individual ownership were greater than those for establishments controlled by firms. Of the leading states in the industry, Pennsylvania had the largest proportion of establishments under individual ownership, namely, 39.9 per cent.

SIZE OF ESTABLISHMENTS.

Classification by value of products.—Table 11 presents statistics for 1909 and 1904 for hosiery and knitting mills grouped according to the value of their products.

In comparing the figures shown for 1909 and 1904 in the foregoing table, it should be noted that by reason of advance in prices of materials and products an establishment might pass from a lower to a higher class without a corresponding increase in the quantity of its output.

Table 11

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
	Total.....	1,374	1,144	\$200,143,527	$137,076,454
Less than \$5,000.....	129	121	319,050	313,493
\$5,000 and less than \$20,000.....	221	197	2,627,769	2,288,270
\$20,000 and less than \$100,000.....	534	1,450	27,241,283	1,222,809,014
\$100,000 and less than \$1,000,000.....	465	365	132,829,875	96,646,967
\$1,000,000 and over.....	25	11	37,125,550	15,018,710
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	9.4	10.6	0.2	0.2
\$5,000 and less than \$20,000.....	16.1	17.2	1.3	1.7
\$20,000 and less than \$100,000.....	38.9	139.3	13.6	116.8
\$100,000 and less than \$1,000,000.....	33.8	31.9	66.4	70.5
\$1,000,000 and over.....	1.8	1.0	18.5	11.0

¹ Includes one establishment with products valued at \$100,000 and less than \$1,000,000 to avoid disclosure of individual operations.

Of the 1,374 hosiery and knitting mills reported for 1909, 25, or 1.8 per cent, manufactured products valued at \$1,000,000 or over. In 1904 there were 11 establishments of this class out of a total of 1,144. While such establishments represented an insignificant proportion of the total number at both censuses, they reported 18.5 per cent of the total value of products of the industry in 1909 and 11 per cent in 1904. On the other hand, the small establishments—that is, those manufacturing products valued at less than \$20,000—constituted more than one-quarter (25.5 per

cent) of the total number of establishments in 1909, but the value of their products amounted to only 1.5 per cent of the total. Both in 1909 and 1904 the greater part of the products of the industry were manufactured in establishments with products valued at from \$100,000 to \$1,000,000, such establishments reporting 66.4 per cent of the total value of products for the industry in 1909 and 70.5 per cent in 1904.

The average value of products per establishment increased from \$119,822 in 1904 to \$145,665 in 1909, and the average value added by manufacture, as com-

puted from the figures in Table 1, from \$52,699 to \$65,431. The increase in these averages was due, in part, to the increase in the prices of materials and products. The average number of wage earners per establishment increased from 91 in 1904 to 94.1 in 1909.

Classification by number of wage earners.—Table 12 gives a classification, according to the number of wage earners employed, in the hosiery and knitting mills in 21 states in which an average of more than 500 wage earners were employed in 1909.

Table 12

HOSIERY AND KNIT GOODS INDUSTRY: 1909

STATE.	Total.		Establishments employing—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
	Estab-lish-ments.	Wage earners (average number).	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States ..	1,374	129,275	31	188	479	298	3,907	288	9,780	233	16,840	234	36,105	89	31,954	28	17,669	7	12,541
Alabama.....	6	611						2	77	1	92	3	442						
Connecticut.....	21	3,340		2	6	1	15	1	40	2	141	11	1,749	4	1,389				
Georgia.....	22	2,743						2	87	11	752	6	935	3	969				
Illinois.....	43	2,913	4	11	37	11	144	7	201	2	179	3	453	5	1,899				
Indiana.....	5	1,933						1	28			2	371					1	1,522
Maryland.....	11	1,022	3	2	4			1	38	1	72	2	288	2	620				
Massachusetts.....	65	9,941	3	12	26	10	116	17	569	10	749	6	1,017	3	944	2	1,457	2	5,063
Michigan.....	35	2,545		3	8	12	161	5	165	8	556	5	764	2	891				
Minnesota.....	10	1,052		1	5	3	36	3	87			2	265			1	659		
New Hampshire.....	21	3,129	1	2	6	3	32			3	207	7	1,119	4	1,224	1	541		
New Jersey.....	37	2,506		3	8	11	150	14	454	5	365	1	116	2	675	1	738		
New York.....	360	35,950	7	44	133	107	1,409	57	1,912	44	3,298	68	10,326	21	8,167	9	6,451	3	4,254
North Carolina.....	62	5,151		6	23	12	176	9	316	20	1,377	11	1,512	3	840	1	907		
Ohio.....	39	3,149		10	25	2	29	7	229	9	672	9	1,550	2	644				
Pennsylvania.....	464	38,206	7	39	108	90	1,181	137	4,738	95	6,796	62	9,584	25	9,299	8	4,798	1	1,702
Rhode Island.....	17	1,774		1	1	3	32	3	96	3	191	5	875	2	579				
South Carolina.....	7	839				1	19	2	53	1	87	2	286	1	394				
Tennessee.....	22	3,117		1	5	3	48	2	70	4	258	9	1,385	2	688	1	663		
Vermont.....	8	946		1	5			2	79	3	213	1	151	1	496				
Virginia.....	11	1,715						1	21	3	262	5	827	2	605				
Wisconsin.....	61	4,282	5	15	34	13	161	8	307	7	513	9	1,379	3	1,072	1	816		

Of the 1,374 establishments reported for 1909, 31, or 2.3 per cent, employed no wage earners, 33.9 per cent employed from 1 to 20 wage earners, 37.9 per cent from 21 to 100, 23.5 per cent from 101 to 500, and 2.4 per cent more than 500.

Of the total number of wage earners employed, 3.4 per cent were reported by establishments employing from 1 to 20 wage earners, 20.6 per cent by establishments employing from 21 to 100, 52.6 per cent by establishments employing from 101 to 500, and 23.4 per cent by establishments employing more than 500 wage earners. Most of the establishments employing over 500 wage earners were situated in New York, Pennsylvania, and Massachusetts.

EXPENSES.

As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought

out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses reported for hosiery and knitting mills in 1909 to have been \$175,729,583, distributed as follows: Cost of materials, \$110,241,053, or 62.7 per cent; wages, \$44,740,223, or 25.5 per cent; salaries, \$7,691,457, or 4.4 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$13,056,850, or 7.4 per cent.

Table 13 shows, by states, for 1909, the per cent distribution of the expenses reported for the hosiery and knit goods industry.

The differences among the states with respect to the proportions which the cost of materials and wages, respectively, formed of the total reported expenses are attributable largely to differences in the character of materials used and to differences in the degree of fineness and elaboration of the products. The cost of materials is likely to form a smaller proportion and

wages a higher proportion of the total expenses in establishments which do their own spinning than in establishments that buy the yarn which they use for knitting.

Table 13.

STATE.	PER CENT OF TOTAL EXPENSES REPORTED FOR THE HOSIERY AND KNIT GOODS INDUSTRY: 1909			
	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.
United States	4.4	25.5	62.7	7.4
Alabama.....	5.5	24.4	61.7	8.3
California.....	14.5	25.7	45.8	14.0
Connecticut.....	6.2	26.1	58.3	9.4
Delaware.....	3.0	28.6	66.0	2.5
Georgia.....	5.2	24.2	62.9	7.7
Illinois.....	4.5	22.6	65.4	7.5
Indiana.....	9.3	36.0	48.0	6.7
Iowa.....	8.1	25.8	51.1	15.1
Maine.....	9.9	22.4	49.8	17.9
Maryland.....	2.8	22.4	66.7	8.2
Massachusetts.....	4.2	31.4	56.7	7.7
Michigan.....	9.3	22.1	53.8	9.8
Minnesota.....	10.4	19.4	60.6	9.5
New Hampshire.....	2.3	27.5	63.4	6.8
New Jersey.....	6.9	29.6	59.9	3.6
New York.....	3.4	24.8	64.7	7.0
North Carolina.....	4.1	24.0	67.0	4.9
Ohio.....	6.8	18.6	66.8	7.8
Pennsylvania.....	3.8	26.8	62.0	7.4
Rhode Island.....	4.4	18.8	72.3	4.6
South Carolina.....	4.5	26.3	57.9	11.3
Tennessee.....	3.8	22.2	64.9	9.1
Utah.....	7.2	13.5	74.9	4.4
Vermont.....	2.7	24.8	65.9	6.6
Virginia.....	3.9	22.7	66.1	7.3
Wisconsin.....	7.6	23.6	58.0	10.8
All other states.....	7.1	34.1	51.4	7.4

The percentage that the cost of materials formed of the total expenses reported varies considerably in the different states, being highest in Utah (74.9) and Rhode Island (72.3) and lowest in California (45.8), Indiana (48), and Maine (49.8). For New York the percentage was 64.7; for Pennsylvania, 62; and for Massachusetts, 56.7. In Massachusetts the mills use relatively more raw cotton and less purchased cotton yarn than in Pennsylvania and New York.

ENGINES, POWER, AND FUEL.

Engines and power.—As shown by Table 1, the amount of power used in the industry increased from 6,498 horsepower in 1869 to 103,709 in 1909. Table 14 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the hosiery and knitting mills increased from 57,346 horsepower in 1899 to 103,709 horsepower in 1909, or 80.8 per cent. In 1909, as in 1904 and 1899, the power of steam engines constituted by far the larger part of the total primary power. Water power, which formed 25.8 per cent of the total primary power in 1899, consti-

tuted only 11.6 per cent of the total in 1909. There was a marked increase during the decade, on the other hand, in the relative importance of electric motors operated by purchased current (rented electric power), the total horsepower of such motors increasing from 1,304, or 2.3 per cent of the total primary power, in 1899, to 13,286, or 12.8 per cent of the total, in 1909. The number and horsepower of electric motors used for applying power by means of current generated in the establishments reporting also show very large increases.

Table 14

KIND.	HOSIERY AND KNIT GOODS INDUSTRY.								
	Number of engines or motors.			Horsepower.			Percent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	2,736	1,414	932	103,709	78,769	57,346	100.0	100.0	100.0
Owned.....	1,085	1,049	932	88,033	71,660	54,727	84.9	91.0	95.4
Steam.....	811	795	697	74,560	57,460	39,693	71.9	72.9	69.2
Gas.....	113	76	29	1,235	668	206	1.2	0.8	0.4
Water wheels.....	158	176	206	12,015	13,522	14,824	11.6	17.2	25.8
Water motors.....	3	2	(¹)	23	10	(¹)	(²)	(²)	.....
Other.....	.....	.....	.....	200	.....	4	0.2	.....	(²)
Rented.....	1,651	365	.....	15,676	7,109	2,619	15.1	9.0	4.6
Electric motors..	1,651	365	(¹)	13,286	4,648	1,304	12.8	5.9	2.3
Other.....	.....	.....	.....	2,390	2,461	1,315	2.3	3.1	2.3
Electric motors.	2,839	779	71	25,465	9,724	2,049	100.0	100.0	100.0
Run by current generated by establishment.....	1,188	414	71	12,199	5,076	745	47.9	52.2	36.4
Run by rented power.....	1,651	365	(²)	13,286	4,648	1,304	52.1	47.8	63.6

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 15 shows for 1909 the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in the 21 states for which statistics have been presented in previous tables.

The states which ranked highest with respect to the amount of power used were New York, Pennsylvania, and Massachusetts, the total horsepower reported for these states in 1909 being 66,792, or 64.4 per cent of the aggregate for all hosiery and knitting mills in the United States. Steam was the most important form of power in all of the states shown separately with the exception of New Hampshire, where water power formed 65.1 per cent of the total primary power. New York exceeds any other state in the horsepower of steam engines, water wheels, electric motors, and gas and other internal-combustion engines.

New York was the leading state in the use of raw cotton in all three years, with Massachusetts second. Connecticut and New Hampshire both show a decrease in the amount used in 1909 as compared with 1899.

A decrease in the amount of wool used took place between 1899 and 1909 in every state for which figures are given in the table. New York used more raw wool than any other state, the consumption in 1909 in this state amounting to 27.8 per cent of the total for the industry in the United States.

The greater part of the shoddy, mungo, and wool extract reported (more than one-half in each of the three years covered by the table) was reported from New York. More than one-half of the total amount of purchased wool waste and noils used in the industry in 1909 (4,398,579 pounds) was also reported from New York.

Of the total amount of purchased yarns used in the industry in 1909 (238,736,996 pounds), 94,455,289 pounds, or 39.6 per cent, was reported from New York. Pennsylvania ranked second in this respect, with 61,995,291 pounds, or 26 per cent of the total.

Of the purchased cotton yarn used in 1909, 39.9 per cent was used in New York and 27.2 per cent in Pennsylvania. Every state for which statistics as to this material are given in the table shows an increase between 1899 and 1909 in the quantity used, the largest relative increases being in Ohio (873.1 per cent) and North Carolina (345.9 per cent).

Of the purchased woolen yarn used in the industry in 1909, slightly more than one-half (51.9 per cent) was reported from New York. With the exception of Massachusetts, which shows a slight decrease, all the states listed in the table show gains in consumption for the decade, the largest relative increases being in Ohio, where the consumption in 1909 was nearly twelve times that in 1899, and New York and New Jersey, where the consumption in 1909 was more than three and one-half times as great as in 1899. New York also led the states in the use of purchased worsted yarn in 1909, its consumption in that year being more than twice as great as in 1899.

Table 18 gives statistics as to the other materials used in the industry, by states, for 1909.

HOSIERY AND KNIT GOODS INDUSTRY—OTHER MATERIALS USED, BY STATES: 1909.

Table 18	MATERIAL AND STATE.	Quantity (pounds).	Cost.	MATERIAL AND STATE.	Quantity (pounds).	Cost.
	Tops	121,565	\$92,995	Linen, jute, and other vegetable fiber yarns—Contd.		
	Connecticut.....	38,783	29,597	Wisconsin.....	4,941	\$5,464
	New York.....	66,914	49,789	All other states.....	174,334	51,686
	All other states.....	15,868	13,609			
	Merino (cotton mixed) yarn	4,014,609	2,667,051	All other materials forming a component part of products (not including those covered by Table 17)		1,502,919
	Illinois.....	297,119	201,890	Connecticut.....		18,853
	Massachusetts.....	466,747	475,769	Illinois.....		26,366
	Michigan.....	149,591	63,699	Massachusetts.....		11,537
	Minnesota.....	164,004	140,895	New Hampshire.....		20,603
	New Hampshire.....	69,405	67,316	New York.....		1,170,422
	New York.....	925,440	693,856	Pennsylvania.....		31,843
	Ohio.....	843,181	398,934	Virginia.....		193,364
	Pennsylvania.....	389,296	202,453	All other states.....		29,931
	Rhode Island.....	314,648	146,544			
	Wisconsin.....	238,931	159,978	Chemicals and dyestuffs		2,541,939
	All other states.....	156,247	115,717	Connecticut.....		62,249
				Georgia.....		64,558
	Silk yarn and spun silk yarn	982,753	8,608,599	Illinois.....		87,423
	Massachusetts.....	124,715	369,777	Indiana.....		25,456
	New Jersey.....	57,403	231,114	Maryland.....		28,965
	New York.....	423,230	1,644,056	Massachusetts.....		242,632
	Ohio.....	38,281	97,848	Michigan.....		64,091
	Pennsylvania.....	250,467	978,071	New Hampshire.....		91,871
	Rhode Island.....	22,900	84,955	New Jersey.....		102,941
	Wisconsin.....	38,582	117,606	New York.....		363,607
	All other states.....	27,175	83,172	North Carolina.....		151,399
				Pennsylvania.....		804,026
	Linen, jute, and other vegetable fiber yarns	241,754	180,818	Rhode Island.....		32,160
	Massachusetts.....	7,408	17,215	Tennessee.....		121,614
	New York.....	11,296	9,266	Wisconsin.....		179,336
	Ohio.....	27,800	79,680	All other states.....		139,681
	Pennsylvania.....	15,975	17,507			

PRODUCTS.

Summary for the United States.—Table 19 shows the products of the hosiery and knit goods industry in the United States, as reported at the censuses of 1909, 1904, and 1899.

Of the total value of products of the industry in 1909, that of hosiery constituted 34.3 per cent; that of shirts, drawers, and combination suits, 42.2 per cent; that of sweaters, cardigan jackets, etc., 11.2 per cent; that of gloves and mittens, 3.6 per cent; and that of all other products, 8.6 per cent. In the case of each of the classes of hosiery, as well as of shirts and drawers and combination suits, the cotton product predominated as to both quantity and value.

Cotton hosiery constituted 91.2 per cent of the total output of hosiery in 1909, as compared with 88.2 per cent in 1899. Of the cotton hosiery manufactured in 1909, 43.3 per cent consisted of half hose. Woolen and worsted hosiery constituted only 3.5 per cent of the total output in 1909, and of such hosiery, 47.6 per cent was half hose. Most of the merino hosiery consisted of half hose.

Of the shirts and drawers made in 1909, 89.1 per cent were cotton and 10 per cent merino or mixed.

The total production of hose and half hose increased from 29,903,899 dozen pairs in 1899 to 62,825,069 dozen pairs in 1909, a gain of 110.1 per cent, while the value of this class of products increased 150.6 per cent. The production of silk hose, which aggregated only

Table 20							
PRODUCT.	Total.	Production in the hosiery and knit goods industry.	Production in other industries. ¹	PRODUCT.	Total.	Production in the hosiery and knit goods industry.	Production in other industries. ¹
Value of products.....	\$203,119,276	\$200,143,527	\$2,975,749	Combination suits—Continued.			
Hosiery:				Merino or mixed—			
Dozen pairs.....	63,313,290	62,825,069	488,221	Dozens.....	364,439	364,387	52
Value.....	\$69,381,989	\$68,721,825	\$660,164	Value.....	\$4,218,160	\$4,217,432	\$728
Cotton—				All other—			
Dozen pairs.....	67,684,372	57,305,021	379,351	Dozens.....	61,079	61,079	
Value.....	\$56,215,975	\$55,909,987	\$305,988	Value.....	\$922,507	\$922,507	
Merino or mixed—				Sweaters, cardigan jackets, etc.:			
Dozen pairs.....	2,864,879	2,857,670	7,209	Dozens.....	2,228,038	2,221,410	6,628
Value.....	\$4,792,600	\$4,766,195	\$26,405	Value.....	\$22,523,797	\$22,430,817	\$92,980
Woolen or worsted—				Gloves and mittens:			
Dozen pairs.....	2,329,625	2,227,964	101,661	Dozen pairs.....	2,538,761	2,527,889	10,872
Value.....	\$4,772,998	\$4,445,227	\$327,771	Value.....	\$7,310,097	\$7,296,887	\$13,210
Silk—				Leggings and gaiters:			
Dozen pairs.....	434,414	434,414		Dozen pairs.....	95,285	65,326	29,959
Value.....	\$3,600,416	\$3,600,416		Value.....	\$521,601	\$192,242	\$329,359
Shirts and drawers:				Hoods, scarfs, nubias, etc.:			
Dozens.....	25,855,725	25,337,779	517,946	Dozens.....	904,728	888,223	16,505
Value.....	\$70,738,024	\$69,592,817	\$1,145,207	Value.....	\$3,373,066	\$3,217,985	\$155,081
Cotton—				Shawls:			
Dozens.....	23,084,107	22,567,121	516,986	Dozens.....	218,923	218,923	
Value.....	\$51,145,228	\$50,007,598	\$1,137,630	Value.....	\$916,294	\$916,294	
Merino or mixed—				Fancy knit goods, wristers, etc.:			
Dozens.....	2,537,398	2,536,473	925	Dozens.....	974,600	943,267	31,333
Value.....	\$17,062,451	\$17,055,624	\$6,827	Value.....	\$2,428,414	\$2,392,927	\$35,487
All wool—				Boot and shoe linings:			
Dozens.....	178,198	178,163	35	Square yards.....	10,546,770	9,726,770	820,000
Value.....	\$1,821,271	\$1,820,521	\$750	Value.....	\$1,314,298	\$1,209,464	\$104,834
Silk and silk mixed—				Eider down goods, jersey cloth, stockinet, astrakhan, and similar fabrics:			
Dozens.....	56,022	56,022		Square yards.....	4,819,801	4,819,801	
Value.....	\$709,074	\$709,074		Value.....	\$1,496,009	\$1,496,009	
Combination suits:				Yarns for sale:			
Dozens.....	2,474,696	2,473,103	1,593	Pounds.....	7,945,734	7,945,734	
Value.....	\$14,873,526	\$14,853,536	\$19,990	Value.....	\$1,785,531	\$1,785,531	
Cotton—				All other products.....	\$5,373,078	\$4,954,708	\$418,370
Dozens.....	2,049,178	2,047,637	1,541	Contract work.....	\$1,083,552	\$1,082,485	\$1,067
Value.....	\$9,732,859	\$9,713,597	\$19,262				

¹ These industries include boots and shoes, rubber; clothing, men's, including shirts; clothing, women's; cotton goods, including cotton small wares; gloves and mittens, leather; hats and caps, other than felt, straw, and wool; millinery and lace goods; silk and silk goods; woolen, worsted, and felt goods, and wool hats.

² Includes products to the value of \$1,028,907, chargeable to the following industries: Boxes, fancy and paper; clothing, men's, including shirts; clothing, women's; dyeing and finishing textiles; fancy articles, not elsewhere specified; gloves and mittens, leather; hats and caps, other than felt, straw, and wool; instruments, professional and scientific; photographic apparatus and materials; waste; woolen, worsted, and felt goods, and wool hats.

Table 20 shows, for 1909, the quantity and value of the principal classes of hosiery and knit goods, so far as reported separately, manufactured, respectively, in all industries combined, in the hosiery and knit goods industry, and in other industries.

The total value of products reported for the hosiery and knit goods industry in 1909 (\$200,143,527) includes \$2,814,438 representing the value of products other than hosiery and knit goods and of yarns, which class of products are usually the primary products of other industries. The subtraction of this latter figure from the total value of products for the industry leaves a remainder of \$197,329,089, which represents approximately the value of the hosiery and knit goods made in the industry. On the other hand, hosiery and knit goods to the value of \$2,975,749 were reported by establishments engaged primarily in the manufacture of other products, although this may not represent the total production of hosiery and knit goods outside the hosiery and knit goods industry, as some establishments making these products may not have reported them separately. Adding together the two figures just given, a total of \$200,304,838 is obtained, which represents approximately the total value of the strictly hosiery and knit goods manufactured in 1909, whether in the hosiery and knit goods industry or in other industries.

Products, by states.—Table 21 shows the different products of the industry in 1909, 1904, and 1899, by states.

Of the hosiery manufactured in the United States in 1909, Pennsylvania produced 27,832,601 dozen pairs,

or 44.3 per cent; Massachusetts, 4,506,960 dozen pairs; and Georgia, 3,726,330 dozen pairs. Wisconsin shows the largest percentage of increase in production for the decade 1899–1909 (260.8), Georgia following with 211.7. Connecticut, New Jersey, and Ohio show a decrease in production for the five-year period 1904–1909, although the output in 1909 was in each case somewhat greater than that in 1899.

Of the total output of cotton hosiery manufactured in the United States in 1909, Pennsylvania produced 27,139,582 dozen pairs, or 47.4 per cent. New York, the leading state in the hosiery and knit goods industry as a whole, produced only an insignificant quantity of cotton hose. Wisconsin shows the largest percentage of increase from 1899 to 1909 (487.7), although that for North Carolina is nearly as great (442.9). New Jersey is the only state listed in the table which shows a decrease between 1899 and 1909; all of this decrease, however, took place in the five-year period 1904–1909.

In the manufacture of woolen and worsted hosiery New Hampshire is the leading state, producing 44.5 per cent of the entire output in 1909. Pennsylvania showed an increase of 107 per cent in 1909 as compared with 1899, which is the highest rate of increase reported for any state. As compared with 1904, however, the production in 1909 represented a decrease of 14.6 per cent. Wisconsin also showed a decrease in output in 1909 as compared with 1904, although the production was slightly larger in 1909 than in 1899.

In the manufacture of merino hosiery New Hampshire, Michigan, Illinois, Rhode Island, Ohio, and Connecticut were the six leading states. Of the states for which figures are given in Table 21, New Hampshire and Ohio show large increases in production for the decade, while Pennsylvania shows a decrease, all of this decrease, however, taking place during the five-year period 1899-1904.

In the manufacture of silk hosiery, Pennsylvania is the leading state, producing, in 1909, 33.5 per cent of the total output reported for the United States.

Of the total output of shirts and drawers in 1909, New York produced 49.2 per cent. Pennsylvania was the second state in importance in the manufacture of these products, reporting 26.5 per cent of the total; in the production of merino or mixed garments, however, Pennsylvania ranked only fifth.

New York and Pennsylvania are also the leading states in the production of combination suits. Massachusetts, Ohio, and New Hampshire are, however, the leading states in the production of merino or mixed suits, New York and Pennsylvania both showing a slight decrease in the production of such suits for the decade as a whole, although an increase for the five-year period 1904-1909.

New York is the leading state in the manufacture of sweaters, cardigan jackets, etc., reporting 74.6 per cent of the total output in 1909. Wisconsin is the only one of the states for which figures are presented in the table showing an increase between 1899 and 1909 of less than 100 per cent.

New York contributed nearly 50 per cent of the total output of knit gloves and mittens in the United States in 1909; Wisconsin ranked second in quantity of output, while Pennsylvania ranked second in the value of the product. Wisconsin and Michigan show decreases in output for the five-year period 1904-1909, although Wisconsin shows a small increase for the decade as a whole.

In the manufacture of hoods, scarfs, nubias, and similar articles, Wisconsin and Ohio are the leading states. Ohio reported over one-half of the output of knit shawls in 1909 and nearly three-fourths in 1904. New York produces the bulk of the knit leggings and gaiters and Pennsylvania and New York the bulk of the fancy knit goods, wristers, etc. Practically all of the knit fabric used for boot and shoe linings is made in Rhode Island and Connecticut. Pennsylvania, Massachusetts, and New York are the leading states in the manufacture of eider down goods, while New York produced nearly two-thirds of the Jersey cloth and stockinet.

In 1909 the leading states reporting cotton yarn made for sale were New York, Massachusetts, and Illinois, while the bulk of the woolen, worsted, and merino yarns made for sale was reported from Pennsylvania.

In addition to the products listed separately in Table 21, miscellaneous products to the value of \$4,954 708 were reported as manufactured in 1909. Among the more important of these products were bathing suits, athletic suits, women's skirts, waists and sacques, towels and face cloths, stocking feet, glove linings, etc.

Table 22 shows the number of establishments in the hosiery and knit goods industry in 1909 which dyed and finished their goods, the number of establishments that dyed or finished goods owned by others, as well as their own product, and the number that did custom spinning and knitting. Some dyeing and finishing is done for establishments in this industry by establishments in other industries, particularly those engaged in the dyeing and finishing of textiles.

Table 22

STATE.	NUMBER OF ESTABLISHMENTS IN THE HOSEY AND KMIT GOODS INDUSTRY: 1909				
	Total.	Dyeing their own goods.	Finishing their own goods.	Dyeing or finishing for others.	Doing custom spinning or knitting.
United States.....	1,374	381	1,263	39	58
Alabama.....	6	5	5		
California.....	6		6		3
Connecticut.....	21	14	21		5
Delaware.....	4	3	4	1	
Georgia.....	22	15	21		
Illinois.....	43	9	36	2	3
Indiana.....	5	3	5		
Iowa.....	4	3	4		
Maine.....	5	2	3		1
Maryland.....	11	5	9		
Massachusetts.....	65	16	57	2	6
Michigan.....	35	15	33		
Minnesota.....	10	2	10		1
New Hampshire.....	21	13	20	1	2
New Jersey.....	37	5	34	1	4
New York.....	360	91	330	9	15
North Carolina.....	62	35	55	4	
Ohio.....	39	10	36	1	2
Pennsylvania.....	464	68	426	15	7
Rhode Island.....	17	5	16	3	1
South Carolina.....	7	6	7		1
Tennessee.....	22	18	21		
Utah.....	11	3	11		
Vermont.....	8	7	8		
Virginia.....	11	7	11		
Wisconsin.....	61	15	57		5
All other states.....	17	6	17		2

Table 23 shows, by geographic divisions, for the censuses of 1909, 1904, and 1899, the output of hosiery, of shirts and drawers, of combination suits, of cardigan jackets, sweaters, etc., and of gloves and mittens, and the value of all other products, as reported by establishments in the hosiery and knit goods industry.

The Middle Atlantic division is the leading division in the manufacture of hosiery and knit goods, as measured by total value of products, and also ranks first in the production of each class of products shown separately in the table. The New England division ranked second in total value of products in 1909, the East North Central third, and the South Atlantic fourth. The South Atlantic division, however, ranked second in 1909 in the output of hosiery, and third in that of shirts and drawers, showing increases of 221.5 per cent and 53.2 per cent, respectively, for the decade. In 1899 the New England division outranked the South

EQUIPMENT.

Wool-combing machines.—Six wool-combing machines were reported as used in the industry in 1909, three of American manufacture in Massachusetts, and three of foreign manufacture in Illinois. Wool-combing machines were not reported separately in 1904 and 1899, but only the total number of combing machines, while at the census of 1909 the number of wool-combing machines and not the total number of combing machines was reported.

Cards and spindles.—Table 24 shows the number of cards and spindles used in 1909, 1904, and 1899 in the hosiery and knit goods industry in the United States.

At the census of 1899 the number of sets of cotton, worsted, and shoddy cards was not reported. The decrease in the number of woolen and worsted cards and spindles and the increase in that of cotton cards and spindles is a marked feature of the statistics. In 1904 the number of cotton cards and of spindles was approximately the same as for woolen, worsted, and shoddy cards and spindles combined, but in 1909 cotton

cards and spindles constituted two-thirds of the respective totals. During the decade 1899–1909 the number of cotton spindles increased 277,375, or 134.8 per cent, while that of woolen and worsted spindles decreased 57,612, or 18.9 per cent.

CLASS.	HOSIERY AND KNIT GOODS INDUSTRY: 1909					
	Number.			Per cent of total.		
	1909	1904	1899	1909	1904	1899
Sets of cards	2,681	2,001	.....	100.0	100.0	100.0
Cotton.....	1,827	1,000	(1)	68.1	50.0	.....
Woolen.....	785	927	1,161	29.3	46.3	.....
Worsted.....	10	24	(1)	0.4	1.2	.....
Shoddy.....	59	50	(1)	2.2	2.5	.....
Spindles	736,774	603,180	521,871	100.0	100.0	100.0
Producing.....	729,935	596,362	510,172	99.1	98.9	97.8
Cotton.....	483,117	300,037	205,742	65.6	49.7	38.4
Woolen and shoddy.....	244,458	286,661	290,366	33.2	47.6	55.6
Worsted.....	2,360	9,664	14,064	0.3	1.6	2.7
Doubling and twisting.....	6,839	6,818	11,699	0.9	1.1	2.2

¹ Not reported.

Table 25 gives, by states, the statistics of cards and spindles for 1909.

Table 25

STATE.	Sets of cards.			Aggregate.	Spindles.					Doubling and twisting.
	Total.	Woolen, worsted, and shoddy.	Cotton.		Producing.					
					Total.	Muls.			Frame.	
						Total.	Woolen, worsted, and shoddy.	Cotton.		
United States	2,661	1,854	1,827	736,774	729,935	436,582	244,959	191,623	293,353	6,839
Alabama.....	30	.....	30	10,932	10,932	.....	.....	.....	10,932	.....
Connecticut.....	144	114	30	54,108	53,904	52,904	29,768	23,136	1,000	204
Georgia.....	139	.....	139	18,376	17,792	2,400	.....	2,400	15,392	584
Illinois.....	61	13	48	18,384	16,896	6,312	.....	.....	10,584	1,488
Massachusetts.....	545	36	509	164,390	163,248	76,784	10,296	66,488	86,464	1,142
Michigan.....	67	15	52	19,316	18,344	5,528	4,412	1,116	12,816	972
New Hampshire.....	81	66	15	20,939	20,742	17,918	16,750	1,168	2,824	197
New Jersey.....	44	32	12	9,582	9,582	9,582	.....	.....	.....	.....
New York.....	1,151	457	694	303,736	303,528	181,771	126,764	55,007	121,757	208
North Carolina.....	92	.....	92	25,232	24,944	13,264	.....	13,264	11,680	288
Ohio.....	13	13	.....	4,670	4,670	4,670	.....	.....	.....	.....
Pennsylvania.....	115	43	72	34,684	33,648	28,912	15,312	13,600	4,736	1,036
South Carolina.....	16	.....	16	6,640	6,640	6,616	.....	5,616	1,024	.....
Tennessee.....	66	.....	66	11,892	11,892	.....	.....	.....	11,892	.....
Vermont.....	22	19	3	5,424	5,424	5,424	5,424	.....	.....	.....
Virginia.....	25	.....	25	7,572	7,572	7,572	.....	7,572	.....	.....
Wisconsin.....	22	20	2	6,729	6,345	6,345	6,345	.....	.....	384
All other states.....	48	26	22	14,168	13,832	11,580	9,324	2,256	2,252	336

¹ Includes 785 sets of woolen cards, 10 of worsted, and 59 of shoddy.
² Includes 241,699 woolen, 2,360 worsted, and 900 shoddy spindles.

³ Includes 291,494 cotton and 1,859 woolen spindles.
⁴ Includes 2,096 woolen, 1,055 worsted, and 3,688 cotton spindles.

The woolen cards and spindles are largely concentrated in New York and Connecticut. There were 416 sets of woolen cards in New York in 1909, as compared with 491 in 1904 and 674 in 1899; and 114 in Connecticut, as compared with 109 in 1904 and 134 in 1899. Of the total number of sets of cotton cards in 1909, New York and Massachusetts reported nearly two-thirds, and of the total number of producing spindles of all kinds these states reported 63.9 per cent.

Table 26 shows, for 1909, by states, the number of establishments reporting producing spindles and the

number which did not, and also the number of producing spindles and the number of mills having 4,000 or more such spindles each, with the aggregate number of spindles in such mills.

New York reported 66 establishments with producing spindles and 18 of them had more than 4,000 spindles each. Of 37 establishments in New Jersey only 1 reported the operation of spindles, and in Pennsylvania, which had the largest number of establishments of any of the states (464), only 9 establishments reported spindles.

Table 26

ESTABLISHMENTS IN THE HOSIERY AND KNIT GOODS INDUSTRY: 1909

STATE.	Total number.	Without producing spindles.	With producing spindles.			
			Total.		Having 4,000 spindles or over.	
			Number.	Number of spindles.	Number.	Number of spindles.
United States.....	1,974	1,216	158	729,935	45	521,533
Alabama.....	6	4	2	10,932	2	10,932
Connecticut.....	21	6	15	53,904	5	31,260
Georgia.....	22	17	5	17,792	2	8,480
Illinois.....	43	41	2	16,896	2	16,896
Louisiana.....	1	.....	1	4,500	1	4,500
Massachusetts.....	65	56	9	163,248	4	151,160
Michigan.....	35	28	7	18,344	1	12,768
New Jersey.....	37	36	1	9,582	1	9,582
New York.....	360	294	66	303,528	18	209,956
North Carolina.....	62	59	3	24,944	2	22,136
Pennsylvania.....	464	455	9	33,648	4	26,586
South Carolina.....	7	6	1	6,640	1	6,640
Tennessee.....	22	19	3	11,892	2	10,692
All other states.....	229	195	34	54,065	.....	.....

Knitting machines.—Table 27 gives, for the United States, the number of the different kinds of knitting machines reported at the censuses of 1909, 1904, and 1899. Machines in establishments in other industries

are not included in the table, but the number of such machines in 1909 is shown in the footnote.

In 1909 the total number of knitting machines reported by establishments in the industry was 115,019, as against 69,047 in 1899, an increase of 45,972, or 66.6 per cent. Over 96 per cent of all the knitting machines in 1909 were power machines. There was an increase of 3,167, or 21.8 per cent, in the number of spring-beard needle machines between 1899 and 1909, while the increase in the number of latch needle machines was 42,805, or 78.5 per cent. Latch needle machines constituted 84.6 per cent of the total number of machines in 1909, as compared with 79 per cent in 1889.

Circular and circular hosiery automatic machines formed 80.7 per cent of the total number in 1909 and 78.4 per cent in 1899, the proportion of circular hosiery machines increasing from 31.4 per cent of the total number in 1899 to 38.8 per cent in 1909, while that of circular machines fell during the same period from 47 per cent to 41.9 per cent.

Table 28 gives, by states, the knitting-machine equipment of the mills in 1909.

Table 27

KIND OF MACHINE.	NUMBER OF KNITTING MACHINES EMPLOYED IN THE HOSIERY AND KNIT GOODS INDUSTRY.			KIND OF MACHINE.	NUMBER OF KNITTING MACHINES EMPLOYED IN THE HOSIERY AND KNIT GOODS INDUSTRY.		
	1909	1904	1899		1909	1904	1899
Total	115,019	88,374	69,047	Latch needle	97,339	74,475	54,534
Power:				Power:			
Flat.....	10,423	6,964	6,714	Flat—			
Full-fashioned flat.....	3,388	3,542	2,361	Ribbed.....	2,516	2,343	1,655
Circular.....	48,142	39,409	32,470	Plain.....	5,556	2,410	1,936
Circular hosiery, automatic.....	44,676	31,961	21,693	Full-fashioned flat—			
All other.....	4,001	(?)	(?)	Ribbed.....	902	770	358
Hand (Lamb and other varieties).....	4,389	6,498	5,809	Plain.....	309	1,317	869
Spring-beard needle	17,680	13,899	14,513	Circular —			
Power:				Ribbed.....	30,080	24,452	17,490
Flat—				Plain.....	9,806	6,707	6,760
Ribbed.....	964	1,455	1,691	Circular hosiery, automatic.....	40,861	30,313	19,993
Plain.....	1,387	756	1,432	All other.....	3,292	(?)	(?)
Full-fashioned flat—				Hand (Lamb and other varieties).....	4,017	6,163	5,473
Ribbed.....	209	260	65	Per cent of total	100.0	100.0	100.0
Plain.....	1,968	1,195	1,069	Power.....	96.2	92.6	91.6
Circular —				Flat.....	9.1	7.9	9.7
Ribbed.....	2,188	1,087	1,467	Full-fashioned flat.....	2.9	4.0	3.4
Plain.....	6,068	7,163	6,753	Circular.....	41.9	44.6	47.0
Circular hosiery, automatic.....	3,815	1,648	1,700	Circular hosiery, automatic.....	38.8	36.2	31.4
All other.....	709	(?)	(?)	All other.....	3.5	.....	.....
Hand (Lamb and other varieties).....	372	335	336	Hand (Lamb and other varieties).....	3.8	7.4	8.4
				Spring-beard needle.....	15.4	15.7	21.0
				Latch needle.....	84.6	84.3	79.0

¹ In addition, 32 establishments manufacturing hosiery and knit goods as secondary products, reported 1,232 knitting machines, comprising 69 flat power machines, 586 circular, 326 circular hosiery, 112 miscellaneous power machines, and 139 hand machines. Of the 1,232 machines, 307 were spring-beard needle and 925 were latch needle machines.

² Not reported.

³ Not including machines used by manufacturers employing hand machines exclusively, which were not reported in 1904 and 1899.

In 1909 Pennsylvania reported nearly two-fifths of the total number of knitting machines, one-half of the circular automatic hosiery machines, and one-third of the circular machines (ribbed and plain combined). New York reported about one-eighth of the total number and one-fifth of the circular (ribbed and plain) machines, but only a small proportion of the automatic circular hosiery machines.

Sewing machines.—Table 29 gives the number of sewing machines employed in the industry in 1909, 1904, and 1899, and shows, by states, the number in 1909.

The total number reported increased 78.9 per cent during the decade 1899–1909. New York and Pennsylvania together reported more than two-thirds of the total for 1909.

STATE.	Sewing machines employed in the hosiery and knit goods industry.	STATE.	Sewing machines employed in the hosiery and knit goods industry.
United States:		Individual states, 1909—	
1899	43,885	Continued.	
1904	30,410	Minnesota	477
1899	24,535	New Hampshire	398
Individual states, 1909:		New Jersey	654
Alabama	115	New York	19,212
California	124	North Carolina	909
Connecticut	859	Ohio	1,380
Delaware	85	Pennsylvania	10,475
Georgia	721	Rhode Island	578
Illinois	813	South Carolina	104
Indiana	298	Tennessee	611
Iowa	13	Utah	190
Maine	8	Vermont	499
Maryland	36	Virginia	837
Massachusetts	2,869	Wisconsin	694
Michigan	830	All other states	96

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the hosiery and knitting mills are presented, by states, in Tables 30 and 31.

Table 30 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the

industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 31 gives more detailed statistics for the industry for 1909 only.

THE WOOLEN INDUSTRY

WOOLEN, WORSTED, AND FELT GOODS AND WOOL HATS
CARPETS AND RUGS, OTHER THAN RAG
SHODDY
WOOL PULLING AND WOOL SCOURING

THE WOOLEN INDUSTRY.

WOOLEN, WORSTED, AND FELT GOODS, AND WOOL HATS.

GENERAL STATISTICS.

GENERAL SUMMARY.

Scope of the industry.—The industry designated “woolen, worsted, and felt goods, and wool hats” (referred to for brevity as “the woolen industry”) includes four classes of establishments distinguished on the basis of their primary products, as follows: (1) Those producing woolen goods, (2) those producing worsted goods, (3) those producing felt goods, and (4) those producing wool hats. Establishments engaged primarily in manufacturing carpets and rugs have been included in the woolen industry at previous censuses, but it was thought better in 1909 to present statistics for the manufacture of carpets and rugs as a separate industry. It has been possible in most cases, however, to revise the statistics for prior censuses by omitting the figures relating to the manufacture of carpets and rugs, so as to make them comparable with the statistics presented for 1909. The remanufacture of fiber from rags, tailor’s clippings, and all kinds of mill

waste, constituting the shoddy industry, is likewise treated as a separate industry.

It may be noted that the four branches of the woolen industry are coordinate—that is, no branch is engaged primarily in preparing materials for any other branch. Within the woolen goods and worsted goods branches, however, more particularly in the latter, there is duplication in the cost of materials and value of products by reason of the use of some of the products—principally yarn—of certain mills as materials for other mills.

In general, only the totals for the industry as a whole are shown in the tables of Volumes VIII and IX of the Thirteenth Census Reports, and it has been considered unnecessary to show separate figures for the four branches in compiling the majority of the tables of the present report.

Summary for the four branches of the industry: 1909.—Table 1 presents for 1909 a summary for the woolen industry as a whole and for each of its branches.

Total for the industry.	Establishments engaged primarily in manufacturing—				Per cent of total contributed by establishments engaged primarily in manufacturing—			
	Woolen goods.	Worsted goods.	Felt goods.	Wool hats.	Woolen goods.	Worsted goods.	Felt goods.	Wool hats.
Number of establishments.....	985	587	324	43	59.6	32.9	4.4	3.1
Persons engaged in the industry.....	175,176	54,771	114,422	3,856	31.3	65.3	2.2	1.2
Proprietors and firm members.....	732	480	197	19	65.6	26.9	2.6	4.9
Salaries employees.....	5,722	2,111	3,213	293	36.9	65.8	5.1	1.8
Wage earners (average number).....	168,722	52,180	111,012	3,544	30.9	65.8	2.1	1.2
Primary horsepower.....	362,209	132,830	215,453	11,405	36.7	59.5	3.1	0.7
Capital.....	\$430,578,574	\$120,320,070	\$295,057,923	\$12,724,833	\$2,475,748	27.9	68.5	3.0
Expenses.....	387,998,515	98,079,318	275,828,061	10,167,551	3,923,585	25.3	71.1	2.6
Services.....	82,523,776	25,897,653	53,186,618	2,326,151	1,113,354	31.4	64.5	2.8
Salaries.....	10,097,157	3,322,478	6,034,747	614,271	125,661	32.9	59.8	6.1
Wages.....	72,426,619	22,575,175	47,151,871	1,711,880	987,693	31.2	65.1	2.4
Materials.....	282,878,039	65,651,634	207,786,956	6,967,206	2,472,263	23.2	73.5	2.5
Miscellaneous.....	22,596,700	6,530,081	14,854,507	874,194	337,968	28.9	65.7	3.9
Value of products.....	435,978,558	107,118,858	312,624,663	11,852,626	4,382,411	24.6	71.7	2.7
Value added by manufacture (value of products less cost of materials).....	153,100,519	41,467,224	104,837,727	4,885,420	1,910,148	27.1	68.5	3.2

Of the 985 establishments reported for 1909 for the industry as a whole, 911, or 92.5 per cent, were woolen or worsted mills. Of the total value of products for the industry, these two classes of establishments together contributed \$419,743,521, or 96.3 per cent, a proportion, however, somewhat exaggerated by reason of the duplication above mentioned.

Of the total value of products for the industry as a whole, 71.7 per cent was reported from worsted mills, 24.6 per cent from woolen mills, 2.7 per cent from mills manufacturing felt goods, and 1 per cent from wool-hat factories. The worsted mills reported 65.8 per cent of the total number of wage earners, the woolen

mills 30.9 per cent, the felt goods establishments 2.1 per cent, and the establishments making wool hats 1.2 per cent.

The establishments in the industry as a whole in 1909 gave occupation to an average of 175,176 persons, of whom 168,722 were wage earners, and paid out \$82,523,776 in salaries and wages.

The cost of the materials used in these branches of the industry in 1909 was \$282,878,039, which was equal to 64.9 per cent of the total value of products (\$435,978,558), and the value added by manufacture (that is, the value of products less cost of materials) was \$153,100,519. Were it not for the duplication in the cost of materials,

however, that item would represent a somewhat smaller proportion of the value of products.

Comparison with earlier censuses.—Table 2 summarizes the statistics of these four branches of the woolen industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency,

which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, the figures for that year should be reduced about 20 per cent. Variations from census to census in the relative amount of duplication involved may also affect the comparability of the figures for cost of materials and value of products.

	THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	985	1,074	1,281	1,520	2,135	2,993	-23.1	-8.3	-16.2	-15.7	-28.8	-28.7
Persons engaged in the industry.....	175,176	152,306	135,504	(2)	(2)	(2)	29.3	15.0	12.4			
Proprietors and firm members.....	732	958	999	(2)	(2)	(2)	-26.7	-23.6	-4.1			
Salaried employees.....	5,722	4,593	3,808	(2)	(2)	(2)	50.3	24.6	20.6			
Wage earners (average number).....	168,722	146,755	130,697	125,535	112,301	92,973	29.1	15.0	12.3	4.1	(2)	(2)
Primary horsepower.....	362,209	288,969	244,825	187,958	129,567	(2)	47.9	25.3	18.0	30.3	45.1	
Capital.....	\$430,578,574	\$314,080,617	\$265,730,450	\$207,677,901	\$122,043,691	\$108,910,309	62.0	37.1	18.2	28.0	70.2	12.1
Expenses.....	387,998,515	285,893,406	220,894,992	199,156,258	(2)	(2)	75.6	35.7	29.4	10.9		
Services.....	62,523,776	63,853,945	52,386,531	46,764,354	33,852,394	31,246,432	57.5	29.2	21.9	12.0	38.1	8.3
Salaries.....	10,097,157	6,780,654	5,574,097	(2)	(2)	(2)	81.1	48.9	21.7			
Wages.....	72,426,619	57,073,291	46,812,434	(2)	(2)	(2)	54.7	26.9	21.9			
Materials.....	282,878,039	204,613,142	153,930,408	138,589,082	130,175,723	110,740,799	83.8	38.2	32.9	11.1	6.5	17.6
Miscellaneous.....	22,596,700	17,426,319	14,578,053	13,802,822	(2)	(2)	55.0	29.7	19.5	5.6		
Value of products.....	435,976,558	319,347,570	248,798,133	222,757,318	206,292,884	177,495,689	75.2	36.5	28.4	11.7	8.0	16.2
Value added by manufacture (value of products less cost of materials).....	153,100,519	114,734,428	94,867,725	84,168,236	76,117,161	66,754,890	61.4	33.4	20.9	12.7	10.6	14.0

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The value of products of the woolen industry in 1909 showed an increase of 145.6 per cent over the value in 1869. The number of establishments, however, decreased continuously from 2,993 in 1869 to 985 in 1909. The number of proprietors and firm members also declined from 999 in 1899 (the first census year for which figures are available) to 732 in 1909—a decrease of 26.7 per cent. These decreases are evidently due to the steadily increasing predominance of corporations in the industry and to the consolidation of establishments which has accompanied this movement. During the decade 1899-1909 there was an increase of 29.1 per cent in the number of wage earners employed, an increase of 54.7 per cent in the amount of wages paid, and an increase of 75.2 per

cent in the value of products. The growth of the industry, as measured by the increase in number of wage earners, primary horsepower, and value of products, was greater relatively during this decade than during any other covered by the table.

Comparative statistics for the woolen industry, including the manufacture of carpets and rugs.—At prior censuses, as already stated, the manufacture of carpets and rugs, for which wool forms the chief material, has been associated with the four branches shown in Table 1 as a part of the woolen industry. Table 3, which gives combined statistics for the woolen industry and the carpet and rug industry for each census from 1869 to 1909, is therefore presented for purposes of comparison.

	THE WOOLEN INDUSTRY AND THE CARPET AND RUG INDUSTRY COMBINED.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	1,124	1,213	1,414	1,693	2,330	3,208	-20.5	-7.3	-14.2	-16.5	-27.3	-27.4
Persons engaged in the industry.....	209,882	186,699	164,713	(2)	(2)	(2)	27.4	12.4	13.3			
Proprietors and firm members.....	866	1,107	1,110	(2)	(2)	(2)	-22.0	-21.8	-0.3			
Salaried employees.....	6,987	5,616	4,495	(2)	(2)	(2)	55.4	24.4	24.9			
Wage earners (average number).....	202,029	179,976	159,108	154,271	132,672	105,071	27.0	12.3	13.1	(2)	(2)	(2)
Primary horsepower.....	400,762	322,914	271,665	210,642	140,058	(2)	47.6	24.1	18.9	28.9	50.4	
Capital.....	\$506,205,584	\$370,861,091	\$310,179,749	\$245,886,743	\$143,512,278	\$121,451,059	63.2	36.6	19.6	26.1	71.3	18.2
Expenses.....	450,309,625	343,124,430	262,878,371	241,253,720	(2)	(2)	71.3	31.2	30.6	9.0		
Services.....	100,268,868	78,974,869	64,389,312	68,397,470	40,687,612	35,928,150	55.7	27.0	22.7	10.3	43.5	13.2
Salaries.....	12,306,199	8,177,345	6,455,495	(2)	(2)	(2)	90.6	60.6	26.7			
Wages.....	87,962,669	70,797,524	57,933,817	(2)	(2)	(2)	51.8	24.2	22.2			
Materials.....	322,441,043	242,561,096	181,159,127	167,233,987	149,160,600	124,318,792	78.0	32.9	33.9	8.3	12.1	20.0
Miscellaneous.....	27,599,714	21,588,465	17,329,932	16,622,263	(2)	(2)	59.3	27.8	24.6	10.9		
Value of products.....	507,166,710	380,934,003	296,990,484	270,527,511	238,085,686	199,257,262	70.8	33.1	28.3	9.8	13.6	19.6
Value added by manufacture (value of products less cost of materials).....	184,725,667	138,372,907	116,831,367	103,293,524	88,925,086	74,938,470	69.5	33.5	19.5	12.1	16.2	18.7

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
The industry as a whole	175,176	89,307	75,869
Proprietors and officials	3,192	3,139	53
Proprietors and firm members.....	732	701	31
Salaried officers of corporations.....	782	773	9
Superintendents and managers.....	1,678	1,665	13
Clerks.....	3,262	2,470	792
Wage earners (average number).....	168,722	93,698	75,024
16 years of age and over.....	159,146	89,403	69,743
Under 16 years of age.....	9,576	4,295	5,281
Woolen goods	54,771	35,815	18,956
Proprietors and officials.....	1,542	1,514	28
Proprietors and firm members.....	480	457	23
Salaried officers of corporations.....	406	402	4
Superintendents and managers.....	656	655	1
Clerks.....	1,049	802	247
Wage earners (average number).....	52,180	33,499	18,681
16 years of age and over.....	50,472	32,547	17,925
Under 16 years of age.....	1,708	952	756
Worsted goods	114,422	58,858	66,564
Proprietors and officials.....	1,431	1,411	20
Proprietors and firm members.....	197	191	6
Salaried officers of corporations.....	309	304	5
Superintendents and managers.....	925	916	9
Clerks.....	1,979	1,490	489
Wage earners (average number).....	111,012	55,957	55,055
16 years of age and over.....	103,203	52,654	50,549
Under 16 years of age.....	7,809	3,303	4,506
Felt goods	3,856	3,078	780
Proprietors and officials.....	134	132	2
Proprietors and firm members.....	19	18	1
Salaried officers of corporations.....	55	55	.....
Superintendents and managers.....	60	59	1
Clerks.....	178	137	41
Wage earners (average number).....	3,544	2,807	737
16 years of age and over.....	3,517	2,789	728
Under 16 years of age.....	27	18	9
Wool hats	2,127	1,558	569
Proprietors and officials.....	85	82	3
Proprietors and firm members.....	36	35	1
Salaried officers of corporations.....	12	12	.....
Superintendents and managers.....	37	35	2
Clerks.....	56	41	15
Wage earners (average number).....	1,986	1,435	551
16 years of age and over.....	1,954	1,413	541
Under 16 years of age.....	32	22	10

In order to compare the distribution of the persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 6.

CLASS.	PERSONS ENGAGED IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).				Percent of increase: ¹ 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total	175,176	100.0	152,306	100.0	15.0
Proprietors and firm members.....	732	0.4	958	0.6	-23.6
Salaried employees.....	5,722	3.3	4,593	3.0	24.6
Wage earners (average number).....	168,722	96.3	146,755	96.4	15.0

¹ A minus sign (-) denotes decrease.

Table 7 shows the average number of wage earners in the industry as a whole, distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total	168,722	100.0	146,755	100.0	130,697	100.0
16 years of age and over.....	159,146	94.3	135,725	92.5	121,184	92.7
Male.....	89,403	53.0	77,911	53.1	69,511	53.2
Female.....	69,743	41.3	57,814	39.4	51,673	39.5
Under 16 years of age.....	9,576	5.7	11,030	7.5	9,513	7.3

The proportion of female wage earners 16 years of age and over in 1909 was slightly larger than that in 1904 and 1899, while the proportion of wage earners under 16 years of age shows a decline for the five-year period 1904-1909, this decrease being sufficiently great to result in a decrease for the decade as a whole.

Wage earners classified according to nature of employment.—Table 8 shows, for the United States for 1909 and 1904, and for selected states for 1909, the distribution by sex and age of spinners, weavers, and all other wage earners. It should be noted that the absolute figures for the two censuses are not strictly comparable, owing to the fact that the numbers shown for 1904 are computed averages for the entire year, while those for 1909 are the numbers reported for December 15, or the nearest representative day. The difference between the number of wage earners on this day and the average number for the year 1909, however, was only 6,449, or about 4 per cent of the total; and since there is little variation from month to month in the proportion of the different classes of employees the figures representing the per cent distribution may be taken as fairly comparable.

In 1909, of the 175,171 wage earners 13 per cent were employed as spinners, 22.2 per cent as weavers, and 64.7 per cent in other capacities. In 1904 the percentage of spinners was 13.6, but weavers constituted 27.5 per cent of the total number—a somewhat larger proportion than in 1909.

The proportion of spinners and of weavers is largely indicative of the character of the work which predominates in the mills of the respective states. Of the states represented in the table, Maine shows the highest percentage of weavers (29.6), though the proportion represented by this class of operatives was also large (23 per cent) in Massachusetts. Pennsylvania reported a larger proportion of spinners and a smaller proportion of weavers than any of the other leading states, being the only state shown in which the spinners outnumbered the weavers.

MANUFACTURES.

Wage earners employed, by months.—Table 10 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 18 states in which an average of 500 or more wage earners were employed during the year.

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	168,722	158,318	161,120	165,585	166,851	168,015	171,846	170,818	170,295	171,747	173,321	173,943	172,693
Connecticut.....	7,789	<i>7,110</i>	7,483	7,639	7,633	7,855	8,069	7,923	7,758	7,922	7,949	8,061	8,071
Georgia.....	660	648	657	651	647	659	641	649	665	676	699	675	670
Indiana.....	776	<i>727</i>	737	743	745	774	821	830	805	794	783	787	761
Kentucky.....	818	<i>880</i>	775	799	803	836	838	844	850	830	842	873	850
Maine.....	8,754	<i>8,021</i>	8,313	8,509	8,589	8,643	8,768	8,846	8,665	8,896	9,111	9,307	9,373
Massachusetts.....	53,873	<i>49,715</i>	50,868	52,663	52,968	53,426	54,665	54,944	54,917	55,439	55,878	55,845	55,153
Michigan.....	554	516	524	555	552	565	524	560	560	585	589	606	606
New Hampshire.....	9,486	9,440	<i>9,237</i>	9,409	9,425	9,567	9,648	9,408	9,694	9,289	9,457	9,604	9,651
New Jersey.....	12,652	<i>11,816</i>	11,995	12,122	12,171	12,190	12,586	12,755	12,858	13,022	13,262	13,329	13,712
New York.....	9,460	<i>8,771</i>	8,863	9,312	9,376	9,358	9,950	9,678	9,578	9,670	9,769	9,647	9,538
Ohio.....	2,566	<i>2,368</i>	2,384	2,452	2,481	2,544	2,597	2,683	2,724	2,666	2,626	2,621	2,656
Pennsylvania.....	27,409	<i>25,796</i>	26,140	26,495	27,767	27,449	28,214	27,842	27,376	27,510	27,950	28,383	27,986
Rhode Island.....	24,924	<i>24,072</i>	24,480	25,429	24,880	25,128	25,203	24,811	24,800	25,604	25,365	25,011	24,302
Tennessee.....	1,654	<i>1,669</i>	1,576	1,598	1,591	1,681	1,746	1,729	1,741	1,666	1,675	1,644	1,637
Vermont.....	2,294	2,263	2,245	2,271	2,245	2,282	2,351	2,149	<i>2,143</i>	2,222	2,359	2,492	2,508
Virginia.....	542	526	<i>616</i>	529	554	552	564	549	549	538	530	549	545
West Virginia.....	599	615	612	599	608	622	597	595	602	<i>662</i>	601	596	589
Wisconsin.....	1,046	1,012	1,028	1,050	1,065	1,089	1,116	1,036	1,057	1,036	<i>976</i>	1,025	1,062

¹ The month of maximum employment for each state is indicated by holdface figures, and that of minimum employment by italic figures.

The largest number of wage earners employed during any month of 1909 was 173,943, in November, and the smallest number, 158,318, in January, the minimum number being equal to 91 per cent of the maximum. In 1904 the maximum number, 151,383, was shown for November, and the minimum number, 143,178, for July, the latter number being equal to 94.6 per cent of the former.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for both months, are given for a larger number of states in Table 49.

Prevailing hours of labor.—In Table 11 the wage earners in the industry as a whole in 1909 have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

More than seven-tenths (71 per cent) of the wage earners employed in the industry as a whole in 1909 were in establishments where the prevailing hours were more than 54 but less than 60 per week. Most of the remaining wage earners (26.8 per cent of the total number) were in establishments where the prevailing hours were 60 per week.

In Massachusetts, Rhode Island, New Jersey, and New Hampshire nearly all the wage earners in 1909 were employed in establishments where the prevailing hours were between 54 and 60 per week. In Maine and Vermont, however, among the more important states, more than nine-tenths of the total number were in establishments where the prevailing hours were 60 per week; and in New York and Pennsylvania approximately 45 per cent of the wage earners worked 60 hours per week.

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	168,722	423	1,092	1,102	119,728	45,300	1,075	2
Connecticut.....	7,789	.....	.....	87	4,741	2,961	.....	.....
Georgia.....	660	.....	.....	.....	15	306	339	.....
Indiana.....	776	.....	.....	2	.....	774	.....	.....
Kentucky.....	818	.....	9	.....	.....	738	70	1
Maine.....	8,754	.....	.....	2	701	8,050	.....	1
Massachusetts.....	53,873	359	138	255	48,567	4,554	.....	.....
Michigan.....	554	.....	25	51	.....	478	.....	.....
New Hampshire.....	9,486	.....	.....	8	8,889	597	.....	.....
New Jersey.....	12,652	.....	153	8	11,747	744	.....	.....
New York.....	9,460	30	649	.....	4,570	4,211	.....	.....
Ohio.....	2,566	2	6	.....	1,990	568	.....	.....
Pennsylvania.....	27,409	2	.....	77	14,819	12,511	.....	.....
Rhode Island.....	24,924	2	95	284	22,748	1,795	.....	.....
Tennessee.....	1,654	.....	.....	.....	67	1,029	557	.....
Vermont.....	2,294	1	.....	.....	26	2,229	.....	.....
Virginia.....	542	.....	39	.....	.....	542	.....	.....
West Virginia.....	599	.....	.....	4	.....	594	.....	.....
Wisconsin.....	1,046	2	.....	3	376	665	.....	.....

CHARACTER OF OWNERSHIP.

Table 12 presents statistics with respect to the character of ownership of the establishments in the woolen industry in the United States.

CHARACTER OF OWNERSHIP.	THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	885	1,074	\$435,978,558	\$318,347,570
Individual.....	212	289	22,400,903	31,835,941
Firm.....	¹ 195	² 267	¹ 50,293,809	² 47,694,692
Corporation.....	578	518	363,283,846	239,816,937
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	21.5	26.9	5.1	10.0
Firm.....	¹ 19.8	² 24.9	¹ 11.5	² 14.9
Corporation.....	58.7	48.2	83.3	75.1

¹ Includes one establishment under an unclassified form of ownership, to avoid the disclosure of individual operations.
² Includes two establishments under unclassified forms of ownership, to avoid the disclosure of individual operations.

In 1909, of the total number of mills reported for the industry, 58.7 per cent were under corporate owner-

ship, as compared with 48.2 per cent in 1904. In 1909 the total value of products of these establishments represented 83.3 per cent of the total, and in 1904 75.1 per cent.

Table 13 gives statistics for establishments classified according to form of ownership for the 18 states employing an average of more than 500 wage earners in 1909.

In 1909, 8,746 wage earners, or 5.2 per cent of the total, were employed in establishments under individual ownership; 18,978, or 11.2 per cent, in those under firm ownership (including one under "other" ownership), and 140,998, or 83.6 per cent, in those owned by corporations.

In all the states establishments owned by corporations predominated, both in number of wage earners and in value of products; but as between those owned by individuals and those owned by firms there were some variations, the former outranking the latter in Connecticut and New Hampshire, while in Vermont there were no establishments under firm ownership.

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	212	185	578	3,748	18,978	140,998	\$22,400,903	\$50,293,809	\$363,283,846	\$7,204,230	\$17,168,229	\$128,728,060
Connecticut.....	9	7	40	665	395	6,729	1,484,710	972,985	16,905,533	520,444	448,798	5,555,844
Georgia.....	2	1	4	16	(X)	644	16,967	853,663	8,185	(X)	419,603	
Indiana.....		5	6		49	727		103,523	1,466,442		29,937	484,345
Kentucky.....	4	2	8	8	(X)	810	9,845	(X)	1,268,072	5,222	(X)	416,447
Maine.....	10	5	50	108	251	8,395	173,102	448,497	17,868,521	73,280	195,934	6,859,309
Massachusetts.....	20	27	130	2,262	4,810	46,801	5,822,008	11,885,145	124,259,729	2,001,336	4,658,985	47,330,230
Michigan.....	4	5	6	12	250	292	24,839	767,005	779,520	10,669	360,381	337,475
New Hampshire.....	8	6	25	470	381	8,635	919,166	786,374	15,024,612	304,469	340,162	4,990,961
New Jersey.....	6	7	20	50	2,184	10,418	144,354	6,220,059	27,574,224	43,036	1,615,370	11,246,752
New York.....	14	17	33	96	1,433	7,931	200,029	3,773,116	19,766,276	104,695	1,504,913	7,385,785
Ohio.....	2	7	11	(X)	176	2,390	(X)	494,641	7,195,508	(X)	218,705	2,855,415
Pennsylvania.....	59	73	85	4,340	7,942	15,127	12,195,424	22,867,665	42,383,907	3,576,306	7,006,445	12,230,160
Rhode Island.....	10	6	72	456	573	23,895	806,531	1,009,431	72,784,278	345,100	387,133	22,842,631
Tennessee.....	9	4	8	16	79	1,559	27,134	82,746	1,692,431	10,028	46,626	618,924
Vermont.....	4		13	148		2,146	253,503		4,243,400	91,021		1,526,881
Virginia.....	4	6	6	24	172	346	29,434	263,462	706,545	12,046	97,659	322,643
West Virginia.....	2	3	8	(X)	18	581	(X)	33,897	1,190,950	(X)	18,924	410,764
Wisconsin.....	13	3	17	22	76	948	82,985	134,917	2,011,806	25,146	71,672	757,033

NOTE.—In some states, in order to avoid disclosing individual operations, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such case an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for establishments under firm ownership include those for one establishment under an unclassified form of ownership.

SIZE OF ESTABLISHMENT.

Classification by value of products.—Table 14 presents statistics for 1909 and 1904 for establishments in the woolen industry grouped according to the value of their products.

In 1909, 8.7 per cent of the establishments manufactured products valued at \$1,000,000 or over, as against 5.9 per cent in 1904. While such establishments represented but a small proportion of the total number at both censuses, they reported 57 per cent of the total value of products in 1909 and 42.6 per cent in 1904. Included in this group in 1909 were nine woolen

and worsted mills with products valued at \$5,000,000 or over, the aggregate value of their products exceeding \$90,000,000. Establishments with products valued at \$100,000 but less than \$1,000,000, which constituted the most important group as measured by value of products in 1904, had dropped to second place in 1909.

The average value of products per establishment increased from \$297,344 in 1904 to \$442,618 in 1909, the average value added by manufacture, as computed from the figures in Table 2, from \$106,829 to \$155,432, and the average number of wage earners employed from 137 to 171.

The average number of wage earners per establishment in the woolen goods branch of the industry in 1909 was 89; in the worsted goods branch, 343; in the felt goods establishments, 82; and in the wool hat factories, 64.

VALUE OF PRODUCTS PER ESTABLISHMENT.	THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	985	1,074	\$435,878,558	\$319,347,570
Less than \$5,000.....	111	127	221,621	309,667
\$5,000 and less than \$20,000.....	75	195	838,181	1,984,002
\$20,000 and less than \$100,000.....	203	2,245	11,083,690	2,13,519,645
\$100,000 and less than \$1,000,000.....	510	544	175,491,081	188,540,375
\$1,000,000 and over.....	86	63	248,343,985	135,993,881
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	11.3	11.8	0.1	0.1
\$5,000 and less than \$20,000.....	7.6	18.8	0.2	10.3
\$20,000 and less than \$100,000.....	20.6	22.8	2.5	24.2
\$100,000 and less than \$1,000,000.....	51.8	50.7	40.3	52.8
\$1,000,000 and over.....	8.7	5.9	57.0	42.6

¹ Includes one establishment with products valued at less than \$5,000.
² Includes one establishment with products valued at less than \$5,000 and three establishments with products valued at \$5,000 but less than \$20,000.

Table 15 gives for 1909, 1904, and 1899 the average value of products per establishment for the woolen industry as a whole and for each of the four branches.

BRANCH OF THE INDUSTRY.	AVERAGE VALUE OF PRODUCTS PER ESTABLISHMENT.		
	1909	1904	1899
The industry as a whole.....	\$442,618	\$287,344	\$184,222
Woolen goods.....	182,485	179,641	114,425
Worsted goods.....	964,891	733,385	646,851
Felt goods.....	275,642	229,461	179,491
Wool hats.....	141,368	144,545	149,664

Classification by number of wage earners.—Table 16 classifies the establishments in 18 of the leading states according to the number of wage earners employed.

Of the 985 establishments reported in 1909, 3 per cent employed no wage earners, 22.2 per cent employed from 1 to 20 wage earners each, 15.6 per cent from 21 to 50, 45.1 per cent from 51 to 250, 11.6 per cent from 251 to 1,000, and only 2.4 per cent over 1,000. Of the total number of wage earners, however, only 4.1 per cent were reported by establishments employing from 1 to 50, 32.1 per cent by establishments employing from 51 to 250, 30.6 per cent by establishments employing from 251 to 1,000, and 33.1 per cent by establishments employing 1,000 or more. In Massachusetts, New Hampshire, New Jersey, Ohio, and Vermont, approximately one-half the wage earners were in establishments employing over 1,000.

STATE.	THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).																			
	Total.		Establishments employing in 1909—																	
	Es-tab-lish-ments.	Wage earners (average number).	No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 60 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.		
United States.....	985	163,722	30	118	264	101	1,314	154	5,358	192	14,566	252	38,607	32	27,853	32	23,848	24	55,912	
Connecticut.....	56	7,789	1	2	2	2	14	11	404	10	864	25	3,560	6	1,655			1	1,292	
Georgia.....	7	660		2	2	1	14			1	87	2	305	1	252					
Indiana.....	11	776		2	2	3	47	1	44	1	99	4	584							
Kentucky.....	14	818		7	13	1	9			3	206	3	590							
Maine.....	65	8,754	1	12	25	2	34	2	66	21	1,747	22	3,422	3	967			2	2,493	
Massachusetts.....	183	53,873	1	6	17	8	121	31	1,117	37	2,687	60	9,698	26	9,033	7	5,420	8	25,780	
Michigan.....	15	554	1	5	9	2	26	2	59	4	317	1	143							
New Hampshire.....	39	9,486	2			2	22	5	207	10	720	14	1,927	5	1,610			1	5,000	
New Jersey.....	33	12,652		3	7	4	44	7	274			7	1,049	6	2,305	4	3,074	2	5,899	
New York.....	64	9,460	5	7	21	9	116	11	344	9	711	12	2,067	7	2,290	3	2,260	1	1,651	
Ohio.....	20	2,566		4	8	5	54	3	76	2	168	5	951					1	1,309	
Pennsylvania.....	217	27,409	3	16	35	31	408	48	1,659	49	3,595	47	7,481	10	3,575	10	7,299	3	3,357	
Rhode Island.....	88	24,924		4	8	5	75	8	293	16	1,172	28	4,764	18	5,467	7	5,288	4	7,857	
Tennessee.....	21	1,654	6	4	4	2	24	1	36	3	245	3	409	1	429	1	507			
Vermont.....	17	2,294	1					6	193	7	483	2	344					1	1,274	
Virginia.....	16	642		7	25	4	69	1	23	1	54	3	371							
West Virginia.....	13	599		4	6	6	81	1	41	1	100	1	101	1	270					
Wisconsin.....	33	1,046	2	13	24	4	42	3	110	10	720	1	150							

EXPENSES.

As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative im-

portance of the different classes of expenses which were reported.

Table 17 shows, for the woolen industry as a whole and for each of its four branches, the percentage of the total reported expenses which was represented, respectively, by cost of materials, salaries, wages, and miscellaneous expenses.

Table 17

CLASS.	PER CENT OF TOTAL REPORTED EXPENSES: 1909				
	The woolen industry.	Woolen goods.	Worsted goods.	Felt goods.	Wool hats.
Total.....	100.0	100.0	100.0	100.0	100.0
Cost of materials.....	72.9	66.9	75.3	68.5	63.0
Salaries.....	2.6	3.4	2.2	6.0	3.2
Wages.....	18.7	23.0	17.1	16.8	25.2
Miscellaneous.....	5.8	6.7	5.4	8.6	8.6

There is considerable variation in the percentages for the several branches of the industry, due partly to the fact that there is relatively more duplication in cost of materials in some branches than in others. These variations among the branches explain in part the variations among the states with respect to the distribution of expenses for the industry as a whole, as shown in Table 18.

Table 18

STATE.	PER CENT OF TOTAL EXPENSES REPORTED FOR THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS): 1909			
	Cost of materials.	Salaries.	Wages.	Miscellaneous expenses.
United States.....	72.8	2.6	18.7	5.8
California.....	54.1	11.2	22.0	12.7
Connecticut.....	73.3	3.2	19.9	3.6
Georgia.....	62.4	5.0	24.7	7.8
Illinois.....	65.0	6.3	19.9	8.8
Indiana.....	68.5	4.6	19.0	7.9
Iowa.....	73.9	3.6	17.5	5.1
Kentucky.....	69.2	4.5	19.5	6.9
Maine.....	68.2	2.5	23.2	6.0
Massachusetts.....	71.2	2.4	19.9	6.5
Michigan.....	69.1	4.3	18.8	7.8
Minnesota.....	69.0	4.1	19.8	7.1
New Hampshire.....	69.6	1.8	22.9	5.8
New Jersey.....	74.9	3.1	17.7	4.3
New York.....	69.0	3.8	19.4	7.8
North Carolina.....	66.0	6.2	19.6	8.1
Ohio.....	68.2	3.1	13.7	15.1
Oregon.....	64.1	5.1	24.6	6.2
Pennsylvania.....	76.8	2.5	15.4	5.4
Rhode Island.....	76.5	2.0	17.3	4.2
Tennessee.....	64.5	4.2	24.0	7.3
Vermont.....	66.5	2.0	24.1	7.3
Virginia.....	69.4	4.1	21.5	5.0
West Virginia.....	71.2	2.8	19.9	6.2
Wisconsin.....	68.8	6.3	19.0	5.8
All other states.....	69.6	4.1	19.9	6.5

Among the individual states, California shows the lowest proportion of the total reported expenses for cost of materials (54.1 per cent), and Pennsylvania the highest (76.8 per cent); for wages the percentages ranged from 13.7 in Ohio to 24.7 in Georgia; for salaries, from 1.8 in New Hampshire to 11.2 in California; and for miscellaneous expenses, from 3.6 in Connecticut to 15.1 in Ohio.

ENGINES, POWER, AND FUEL.

Engines and power.—Table 2 shows that the total horsepower used in the woolen industry increased from 129,567 in 1879 to 362,209 in 1909. Table 19 shows statistics of power, as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the industry as a whole increased from 244,825 horsepower in 1899 to 362,209 horsepower in 1909, or 47.9 per cent. In 1909 the power generated by steam engines constituted 72.2 per cent of the total primary power, as compared with 69.1 per cent in 1904 and 66.6 per cent in 1899. The absolute increase in steam power from 1899 to 1909 was 98,203 horsepower, or 60.2 per cent. Water power, which shows but a slight increase for the decade, formed 21.9 per cent of the total in 1909, as compared with 31 per cent in 1899. There was an increase in the relative importance of the power generated by gas engines and by electric motors operated by purchased current (rented electric power). The latter represented 3.8 per cent of the primary power in 1909.

The number and horsepower of electric motors used for distributing power by means of current generated in the same establishment show a large increase.

Table 19

POWER.	THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	2,666	2,518	2,525	362,209	288,989	244,825	100.0	100.0	100.0
Owned.....	2,237	2,376	2,525	342,691	278,106	239,492	94.6	96.2	97.8
Steam.....	1,364	1,394	1,370	261,364	199,615	163,161	72.2	69.1	66.6
Gas.....	53	41	16	2,077	1,705	411	0.6	0.6	0.2
Water wheels.....	816	940	1,139	78,909	76,356	75,911	21.8	26.4	31.0
Water motors.....	4	1	(1)	341	10	(1)	0.1	(2)	.....
Other.....	.....	.....	.....	.....	420	9	.....	0.1	(2)
Rented.....	429	142	(1)	19,518	10,863	5,333	5.4	3.8	2.2
Electric.....	429	142	(1)	13,783	3,930	2,534	3.8	1.4	1.0
Other.....	.....	.....	.....	5,735	6,933	2,799	1.6	2.4	1.1
Electric motors	3,385	556	84	78,223	22,222	5,039	100.0	100.0	100.0
Run by current generated by establishment.....	2,956	414	84	65,440	18,292	2,505	82.6	82.3	49.7
Run by rented power.....	429	142	(1)	13,783	3,930	2,534	17.4	17.7	50.3

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 20 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in 18 of the leading states.

Massachusetts, Pennsylvania, Rhode Island, and New Hampshire together reported 241,724 horsepower, or 66.7 per cent of the aggregate for the industry. Steam power was the most important form of power in all of the states shown separately, with the exception of Maine and Virginia, where water power ranked first. Massachusetts reported the largest amount both of steam power (89,876 horsepower) and of water power (23,384 horsepower). Pennsylvania reported the largest amount of rented electric power, as well as of the power developed by gas engines.

Table 20

THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS): 1909

STATE.	Primary horsepower.										Electric horsepower.		Fuel used.					
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).	
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec-tric.	Oth-er.			Anthra-cite (long tons).	Bitumi-nous (short tons).					
United States..	971	362,209	342,691	261,364	2,077	79,250			13,783	5,735	79,223	65,440	277,755	1,525,988	6,985	34,843	26,611	104,746
Connecticut.....	56	17,518	17,310	10,431	50	6,829			158	50	2,157	2,042	1,993	76,533		14,684	131	229
Georgia.....	7	1,437	1,437	1,225		212					426	426		8,536				
Indiana.....	11	1,078	1,077	1,507		170			1		61	60		14,427				
Kentucky.....	14	2,506	2,481	2,417		64			25		137	112		11,671		200		
Maine.....	65	22,299	19,715	7,905	87	11,723			2,578	6	3,799	1,221	3,170	82,605		2,779	825	
Massachusetts.....	182	117,119	114,005	89,876	745	23,384			2,497	617	39,945	37,448	43,709	550,938	253	1,260	1,636	3,535
Michigan.....	15	1,900	1,815	1,657	50	108			85		272	187		13,127			44	
New Hampshire.....	39	30,485	29,023	16,395	5	12,623			1,457	5	4,880	3,423	805	91,829	208	1,886	500	6,366
New Jersey.....	33	20,254	19,883	19,435	10	438			8	363	4,703	4,701	126,841	26,436			1,358	
New York.....	60	22,374	20,607	13,306	8	7,293			1,575	192	5,665	4,090	30,972	99,821		153	18	889
Ohio.....	18	6,504	5,686	5,397	150	139			818		2,349	1,531		25,634	6,044			9,212
Pennsylvania.....	215	50,405	43,636	41,320	769	1,547			2,917	3,852	5,711	2,794	53,238	210,160		25	1,448	63,302
Rhode Island.....	88	43,715	42,631	37,321	90	5,220			571	513	7,295	6,724	16,867	198,684		1,108	127	
Tennessee.....	21	2,371	2,371	2,282	17	72					412	412		26,591			2,873	10
Vermont.....	17	7,213	7,213	3,885	3	3,325					55	55		35,788	480	2,175		
Virginia.....	16	1,352	1,092	388	20	684			200		260		62	3,471		278		
West Virginia.....	13	1,327	980	902	20	58			347		387	40		7,126				9,028
Wisconsin.....	33	3,059	3,045	1,647	13	1,385			14		19	5		13,838		452	56	
All other states.....	68	8,693	8,084	4,068	40	3,976			472	137	684	169		28,773		6,970	20,458	12,185

Fuel consumed.—Owing to the extensive use of water power in the woolen industry, less fuel is consumed in generating power than would otherwise be required. In 1909 bituminous coal was by far the principal class of fuel used, 1,525,988 short tons being reported, of which 550,938, or 36.1 per cent, were consumed in

Massachusetts. The largest quantity of anthracite coal, 126,841 long tons, or nearly one-half of the total reported for the industry, is shown for New Jersey. Gas, oil, and wood were used to some extent, the largest quantity of gas being reported for Pennsylvania, and of wood for Connecticut.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

MATERIALS.

Summary for the industry as a whole.—Table 21 shows the quantity and cost of the principal materials used in the woolen industry as a whole for 1909, and the quantity for 1904 and 1899.

The increase during the decade 1899–1909 in the consumption of wool, in condition purchased, amounted to 145,870,501 pounds, or 42.6 per cent, and in the consumption on the scoured equivalent basis to 99,932,031 pounds, or 49.7 per cent. The greater part of the increase was in foreign wool, which formed 24.7 per cent of all wool in condition purchased in 1899 and a slightly smaller proportion in 1904, but had increased to 34.4 per cent of the total in 1909. The percentage for domestic wool, on the other hand, decreased from 75.3 per cent in 1899 to 65.6 per cent in 1909, while the consumption decreased 3 per cent between 1904 and 1909, although showing an increase of 28 per cent between 1899 and 1904. The quantity of mohair and camel,

alpaca, and vicuna hair used increased 53.8 per cent during the decade, while that of "other" animal hair increased but 9.5 per cent, although the quantities of mohair and "other" animal hair used in 1904 were materially greater than in either 1909 or 1899. The quantity of cotton and shoddy used materially decreased, the former 48.4 per cent and the latter 28.7 per cent. The quantity of purchased waste and noils of wool, mohair, camel hair, etc., used increased 69.7 per cent, and that of purchased tops increased 257.9 per cent.

Of the several classes of purchased yarns listed in the table, worsted yarns show the greatest rate of increase in consumption for the decade, the quantity used in 1909 being 135.1 per cent greater than that used in 1899. Silk and spun silk yarns show an increase of 114.2 per cent, and cotton yarns an increase of 11.4 per cent. On the other hand, woolen yarns and merino yarns show a decrease of 84.2 per cent and 43.1 per cent, respectively, for the decade.

figures representing equivalent weight in scoured condition, was 98,001,451 pounds, or 50.9 per cent.

The table gives the percentages of increase or decrease in the quantity and value of the various materials for the decade 1899-1909. In general these percentages conform to those shown in Table 21 for the woolen industry as a whole.

Summary for the felt goods branch of the industry.—Table 23 gives the quantity and cost of the materials used in the manufacture of felt goods for 1909, 1904, and 1899.

MATERIAL.	MATERIALS USED IN THE FELT GOODS BRANCH OF THE WOOLEN INDUSTRY.			
	1909	1904	1899	Percent of increase: 1899-1909
Total cost	\$6,967,206	\$5,754,026	\$3,801,028	83.3
Wool:				
In condition purchased—				
Pounds	12,409,826	11,868,238	9,606,263	29.2
Cost	\$3,927,393	\$3,388,588	\$2,196,440	78.8
Equivalent of above in scoured condition, pounds ..	9,308,172	8,131,082	6,468,097	43.9
Animal hair, etc.:				
Pounds	8,144,011	6,974,634	2,819,521	188.8
Cost	\$239,244	\$373,797	\$125,803	90.2
Cotton:				
Pounds	1,375,670	1,982,624	1,225,850	12.2
Cost	\$155,815	\$217,200	\$77,683	100.6
Shoddy, mungo, and wool extract, purchased.				
Pounds	2,536,243	1,532,127	712,373	256.0
Cost	\$261,878	\$157,031	\$80,737	224.4
Waste and noils, purchased.				
Pounds	4,874,712	1,948,969	2,653,590	83.7
Cost	\$1,220,110	\$452,509	\$552,992	120.6
Chemicals and dyestuffs	\$219,891	\$189,750	\$128,296	71.4
All other materials	\$942,875	\$975,151	\$639,077	47.5

The cost of wool in this branch of the industry represented 56.4 per cent of the total cost of materials in 1909, and 57.8 per cent in 1899. Of the increase of \$3,166,178 in cost of materials between 1899 and 1909, \$2,398,071, or 75.7 per cent, represented the increase in the cost of wool and of waste and noils, though the relative increase for most of the other materials was large.

Summary for the wool hat branch of the industry.—Table 24 gives the quantity and cost of the materials used in the manufacture of wool hats for 1909, 1904, and 1899.

The quantity of wool used in the manufacture of wool-felt hats in 1909 was less than half the quantity used in 1899, and while the quantity of waste and noils increased 48.5 per cent during the decade, this increase was not sufficient to offset the decrease in the consumption of wool. The cost of hat bodies and

hats in the rough purchased as materials in 1909 was nearly six times as great as in 1899.

MATERIAL.	MATERIALS USED IN THE WOOL HAT BRANCH OF THE WOOLEN INDUSTRY.			
	1909	1904	1899	Per cent of increase: 1899-1909
Total cost	\$2,472,263	\$1,369,810	\$2,042,202	21.1
Wool:				
In condition purchased—				
Pounds	1,203,498	1,633,525	2,713,374	-55.6
Cost	\$404,127	\$495,594	\$788,973	-48.3
Equivalent of above in scoured condition, pounds ..	989,110	1,231,576	1,898,605	-47.9
Wool waste and noils, purchased:				
Pounds	1,281,764	287,363	862,982	48.5
Cost	\$661,172	\$119,407	\$370,792	78.3
Wool-felt hat bodies and hats in the rough:				
Dozens	21,864	12,089	4,939	342.7
Cost	\$83,020	\$25,997	\$13,920	496.4
Chemicals and dyestuffs	\$104,503	\$63,905	\$108,502	-3.7
All other materials	\$1,219,441	\$664,907	\$760,015	60.4

¹ A minus sign (-) denotes decrease.

Materials used in the woolen industry, by states.—Table 25 gives the quantity and cost of the principal materials used in the woolen industry (all four branches combined) in 1909, and the quantity for 1904 and 1899.

In 1909 Massachusetts reported 32 per cent of the wool used in the industry, Pennsylvania 20.7 per cent, and Rhode Island 16.2 per cent, as compared with 30.6 per cent, 18 per cent, and 14.8 per cent, respectively, in 1899. All of the states listed in the table except Connecticut and Maine show an increase between 1899 and 1909 in the quantity of wool used, New Jersey showing the greatest relative increase (145.2 per cent).

The quantity of cotton used in the woolen industry in 1909 was only a little more than half the quantity used in 1899; and of the total for 1909, Massachusetts reported 32.1 per cent and Pennsylvania 23.4 per cent.

In the quantity of purchased worsted yarn used, every state listed in the table shows a large gain for the decade. Massachusetts reported 29.7 per cent of the total quantity used in 1909, Rhode Island 22.7 per cent, and Pennsylvania 21.5 per cent. On the other hand, each state for which the totals are given shows a large decrease during the decade in the quantity of woolen yarn used. Maine, Massachusetts, and Rhode Island were the only states showing an increased quantity of cotton yarns in 1909 as compared with 1899, the gain being most pronounced in Massachusetts.

Table 28

PRINCIPAL FIBERS USED IN THE WOOLEN INDUSTRY, EXCLUSIVE OF CARPETS AND RUGS (POUNDS).

MATERIAL.	1909	1904	1899	1889
Total	412,845,380	428,204,623	341,850,104	281,523,623
Scoured wool.....	301,004,252	250,642,723	201,072,221	162,447,184
Mohair, and camel, alpaca, and vicuna hair.....	7,847,359	7,198,996	5,101,966	8,376,494
Other animal hair.....	25,600,175	29,480,628	23,378,082	13,206,495
Shoddy.....	56,994,363	104,286,244	70,627,275	56,227,963
Purchased.....	24,052,730	33,484,250	33,752,275	(1)
Made for consumption.....	32,941,633	70,801,994	36,875,000	(1)
Cotton.....	21,399,731	34,596,032	41,470,560	41,270,487
Per cent of total	100.0	100.0	100.0	100.0
Scoured wool.....	72.9	58.8	58.9	57.7
Mohair, and camel, alpaca, and vicuna hair.....	1.9	1.7	1.5	3.0
Other animal hair.....	6.2	6.9	6.8	4.7
Shoddy.....	13.8	24.5	20.7	20.0
Purchased.....	5.8	7.9	9.9	.....
Made for consumption.....	8.0	16.6	10.8	.....
Cotton.....	5.2	8.1	12.1	14.7
Scoured wool and shoddy, total	357,998,615	354,929,967	271,699,496	213,676,147
Per cent of total.....	100.0	100.0	100.0	100.0
Scoured wool.....	84.1	70.6	74.0	74.3
Shoddy.....	15.9	29.4	26.0	25.7
Purchased.....	6.7	9.4	12.4	.....
Made for consumption.....	9.2	19.9	13.6	.....

¹ Not reported separately.

Imports of wool.—Table 29 presents statistics for the imports of wool into the United States in 1909, 1904, and 1899 from the several continental districts, and for the imports of each of the three classes or grades of wool (clothing wool, combing wool, and carpet wool) from the more important countries contributing to the total.

The figures are taken from the report on "Commerce and Navigation of the United States," issued by the Bureau of Foreign and Domestic Commerce of the Department of Commerce. This table covers the total quantity of wool imported.

The imports of wool for the fiscal year 1909 exceeded those for 1899 by approximately 190,000,000 pounds, or 247.2 per cent, the gains being large in the imports from all continental districts except Africa. South America furnished 20.8 per cent of all imports in 1909, as compared with 13.2 per cent in 1899, and Oceania 13.3 per cent in 1909, as compared with 3.6 per cent in 1890.

Table 29

IMPORTS OF WOOL INTO THE UNITED STATES (POUNDS).

	IMPORTS OF WOOL INTO THE UNITED STATES (POUNDS).			IMPORTS OF WOOL INTO THE UNITED STATES (POUNDS).			
	1909 ¹	1904 ¹	1899 ¹	1909 ¹	1904 ¹	1899 ¹	
All classes	268,409,304	173,742,334	76,736,209	By class or grade—Continued.			
Imported from—				Clothing wool, class 1, imported from.			
Europe.....	126,156,163	95,450,635	44,093,670	142,580,993	45,575,993	12,976,999	
South America.....	55,412,106	28,171,843	10,113,649	54,606,609	17,335,314	4,502,541	
Asia.....	47,496,140	37,530,053	19,143,913	41,442,475	16,014,308	2,693,426	
Oceania.....	35,382,010	10,937,498	2,792,019	30,617,828	10,937,498	.....
North America.....	1,837,346	1,511,852	208,697	Uruguay.....	4,911,914	112,208	9,045
Africa.....	125,539	140,953	384,261	Belgium.....	4,723,078	305,343	557,733
				New Zealand.....	4,760,498	.....	.....
				All other countries.....	1,518,591	871,322	5,214,254
Per cent of total	100.0	100.0	100.0	Combing wool class 2 imported from.			
Europe.....	47.4	54.9	57.5	21,952,259	12,934,143	2,155,419	
South America.....	20.8	16.2	13.2	United Kingdom.....	18,334,147	9,443,853	2,111,028
Asia.....	17.8	21.6	24.9	Argentina.....	1,590,188	100,548	.....
Oceania.....	13.3	6.3	3.6	Canada.....	1,484,641	1,419,151	36,971
North America.....	0.7	0.9	0.3	All other countries.....	543,283	1,970,591	7,420
Africa.....	(²)	0.1	0.5	Carpet wool class 3 imported from			
By class or grade:				101,876,052	115,232,698	61,603,791	
Clothing wool (class 1).....	142,580,993	45,575,993	12,976,999	Chinese Empire.....	32,272,982	23,581,814	14,264,551
Combing wool (class 2).....	21,952,259	12,934,143	2,155,419	United Kingdom.....	31,103,417	31,531,212	19,294,414
Carpet wool (class 3).....	101,876,052	115,232,698	61,603,791	Turkey (European and Asiatic).....	7,930,404	13,342,730	4,717,245
				Russia (European and Asiatic).....	9,490,741	24,929,977	13,304,601
Per cent of total	100.0	100.0	100.0	British India.....	4,471,951	2,661,793	816,122
Clothing wool (class 1).....	53.5	26.2	16.9	Germany.....	2,891,902	1,531,864	721,358
Combing wool (class 2).....	8.2	7.4	2.8	Argentina.....	6,672,175	9,938,356	4,830,175
Carpet wool (class 3).....	38.2	66.3	80.3	All other countries.....	7,042,480	7,664,952	3,605,325

¹ Year ending June 30.

² Less than one-tenth of 1 per cent.

The most remarkable gain was in clothing wool (class 1), which increased from 12,976,999 pounds in 1899 to 142,580,993 pounds, or almost eleven times as much, in 1909. This class constituted 53.5 per cent of the total imports of wool in 1909, as compared with 16.9 per cent in 1899. The quantity of combing wool (class 2) imported in 1909 was more than ten times the quantity imported in 1899.

Supply of wool available for manufacture.—Table 30 shows the estimated net supply of wool available for manufacture for each year from 1900 to 1909, inclusive. The figures for domestic production are the estimates of the National Association of Wool Manufacturers, and the figures for imports are taken from the report on "Commerce and Navigation of the United States."

Imports for consumption include imports direct for consumption and withdrawals for consumption of wool held in bond. The statistics for imported wool as here presented represent the quantities of foreign duty-paid wool available for consumption, whereas the wool imports as given in Table 29 are total imports. The increase in bonded warehouse stocks during the fiscal year ending June 30, 1909, over 1908 was more than 50,000,000 pounds.

The estimated supply of wool of all classes in 1909, figured on the basis of imports, exports, and estimated domestic production, was 537,298,699 pounds—an amount larger than that in any previous year except 1895 and 1897. Inasmuch as the textile industries reported the consumption of 559,850,995 pounds of wool (in condition in which purchased) during the

calendar year 1909, there is a fair degree of correspondence between the figures for supply and the consumption of wool for that year. It should be noted that in drawing comparisons between consumption and supply cognizance should be taken of the

stocks held in the mill warehouses, which may vary greatly in different years; but statistics for such stocks are, however, not available. For the five years from 1905 to 1909, inclusive, the average estimated annual supply was somewhat over 500,000,000 pounds.

YEAR.	WOOL SUPPLY (POUNDS).								
	Domestic production. ¹	Imports for consumption. ²			Domestic exports. ²	Net supply.		Ratio of imports to net supply (per cent).	
		Total.	Clothing and combing wool.	Carpet wool.		All classes.	Clothing and combing wool.	All classes.	Clothing and combing wool.
1909	328, 110, 749	209, 216, 326	117, 850, 771	91, 365, 555	28, 376	537, 298, 699	445, 933, 144	38.9	26.4
1908	311, 138, 321	135, 970, 907	72, 117, 429	63, 853, 478	182, 458	446, 926, 770	383, 073, 292	30.4	18.8
1907	298, 294, 750	196, 035, 251	103, 582, 132	92, 453, 119	214, 840	494, 115, 161	401, 662, 042	39.7	25.8
1906	298, 915, 130	219, 495, 010	109, 875, 744	109, 619, 266	192, 481	518, 217, 659	408, 598, 393	42.4	26.9
1905	295, 488, 438	211, 287, 482	98, 691, 605	98, 691, 605	123, 951	506, 651, 969	394, 056, 092	41.7	25.0
1904	291, 783, 032	161, 720, 007	53, 586, 970	108, 133, 037	319, 750	453, 183, 289	345, 050, 252	35.7	16.6
1903	287, 450, 000	179, 651, 038	60, 405, 820	119, 245, 218	518, 919	466, 582, 119	347, 336, 901	38.5	17.4
1902	316, 341, 032	160, 437, 130	61, 949, 400	98, 487, 730	123, 278	476, 654, 884	378, 167, 154	33.7	16.4
1901	302, 502, 382	124, 863, 051	43, 140, 108	81, 722, 943	199, 565	427, 165, 868	345, 442, 925	29.2	12.5
1900	288, 636, 621	128, 250, 945	29, 280, 601	98, 970, 344	2, 200, 309	414, 687, 257	315, 716, 913	30.9	9.3

¹ Estimates of the National Association of Wool Manufacturers.

² Fiscal year ending June 30.

It will be observed that during each year from 1905 to 1909, with the exception of 1908, the proportion of foreign wool in the net supply was considerably higher than for any one of the five years ending with 1904. In 1906 the imports amounted to 42.4 per cent of the supply—the highest proportion for any year shown.

Practically all of the domestic wool is of the finer grades—clothing wool, and combing wool, designated in the statistics of imports and exports as class 1 and class 2, respectively.

Foreign wool in 1909 constituted only 26.4 per cent of the total net supply of classes 1 and 2, but this proportion was considerably higher than the corresponding proportion in any year prior to 1905. The domestic production responded somewhat to the increased demand, however, especially in the years 1908 and 1909, the production of the latter year being, with the exception of the years 1892 and 1893, the largest in the history of wool growing in this country.

PRODUCTS.

Summary for the United States: 1909.—Table 31 shows the quantity and value of the leading products made by establishments in the woolen industry, and of similar products made by establishments in other industries, with the combined totals. Statistics for many classes of goods not separately shown in this table are given in later tables. The products made

by establishments in other industries, however, do not enter into the statistics presented in other tables in this report.

The value of all products of the industry in 1909 was \$435,978,558. In addition, woolen, worsted, and felt goods and wool hats to the value of \$3,862,340 were reported as subsidiary products by establishments engaged primarily in the manufacture of other products, including a small amount received for contract work, this figure including the value of the upholstery goods made in carpet and rug establishments. On the other hand the products reported for the woolen industry include some products other than woolen, worsted, and felt goods and wool hats, while \$3,132,283 was received for contract work, this amount representing chiefly duplication, as the value of the products on which the work was done is included in the main in the value of the products of the establishments within the industry for which it was done. The total value of woolen, worsted, and felt goods and wool hats manufactured (including that of yarns and other partly manufactured products made for sale) was therefore approximately \$439,840,898, although the actual figure probably differs somewhat from this, as some woolen products made by establishments outside the woolen industry may not have been separately reported, while the establishments in the woolen industry may not in all cases have made separate reports of the products primarily manufactured in other industries.

Table 31

PRODUCT.	Total production.	Production in the woolen industry (exclusive of carpets and rugs).	Production in other industries. ¹	PRODUCT.	Total production.	Production in the woolen industry (exclusive of carpets and rugs).	Production in other industries.
All products of the woolen industry, total value.....	\$439,840,898	\$435,978,558	\$3,862,340	Union or cotton mixed woven goods—			
All-wool woven goods:				Continued.			
Square yards.....	324,436,603	323,444,896	991,707	Horse blankets—			
Value.....	\$220,659,988	\$220,079,555	\$580,433	Square yards.....	750,176	694,176	56,000
Wool cloths, doeskins, cassimeres, chevots, etc.—				Value.....	\$214,378	\$186,238	\$28,140
Square yards.....	40,845,464	40,843,979	1,485	All other—			
Value.....	\$29,292,445	\$29,291,059	\$1,386	Square yards.....	11,804,400	11,804,400	
Worsted coatings, serges, and suitings—				Value.....	\$3,933,446	\$3,933,446	
Square yards.....	119,680,955	119,655,069	25,886	Cotton-warp woven goods:			
Value.....	\$101,926,782	\$101,903,153	\$23,829	Square yards.....	211,653,600	210,452,401	1,201,199
Wool dress goods, sackings, tricots, etc., and opera or similar flannels—				Value.....	\$62,662,058	\$62,323,086	\$338,972
Square yards.....	29,166,880	29,099,956	66,924	Worsted filling cassimeres, doeskins, jeans, tweeds, coatings, etc.—			
Value.....	\$16,408,898	\$16,385,498	\$23,400	Square yards.....	29,628,199	29,220,252	407,947
Worsted dress goods, cashmeres, serges, mohair, hunting, etc.—				Value.....	\$15,160,952	\$15,009,081	\$151,871
Square yards.....	106,697,261	105,801,349	895,912	Worsted filling dress goods, cashmeres, serges, mohairs, etc.—			
Value.....	\$54,561,794	\$54,030,376	\$531,418	Square yards.....	65,666,233	65,112,981	553,252
Blankets—				Value.....	\$14,926,066	\$14,798,965	\$127,101
Square yards.....	5,639,934	5,638,434	1,500	Wool filling dress goods and repellants—			
Value.....	\$3,455,135	\$3,454,585	\$600	Square yards.....	13,156,060	12,916,060	240,000
All other—				Value.....	\$2,801,816	\$2,741,816	\$60,000
Square yards.....	22,406,109	22,406,109		All other—			
Value.....	\$15,014,884	\$15,014,884		Square yards.....	103,203,108	103,203,108	
Union or cotton mixed woven goods:				Value.....	\$29,773,224	\$29,773,224	
Square yards.....	37,783,813	37,453,351	330,462	Upholstery goods and sundries.....	\$3,785,229	\$1,988,330	\$1,798,899
Value.....	\$14,418,128	\$14,327,973	\$90,155	Tapestry, terry, plush, rep, etc.—			
Unions, tweeds, chevots, cassimeres, etc.—				Square yards.....	4,390,460	4,176,542	3,203,918
Square yards.....	18,921,290	18,917,478	3,812	Value.....	\$3,327,547	\$1,528,648	\$1,798,899
Value.....	\$7,782,462	\$7,780,854	\$1,608	All other.....	\$457,682	\$457,682	
Sackings, tricots, dress goods, and opera and similar flannels—				Wool felt hats:			
Square yards.....	4,564,539	4,319,539	245,000	Dozens.....	658,528	590,957	67,571
Value.....	\$1,827,153	\$1,776,721	\$50,432	Value.....	\$4,551,430	\$3,646,787	\$904,643
Blankets—				Yarns, woolen, worsted, and merino:			
Square yards.....	1,743,408	1,717,758	25,650	Pounds.....	131,430,238	130,855,808	574,430
Value.....	\$660,689	\$650,714	\$9,975	Value.....	\$93,701,641	\$93,567,183	\$134,458
				All other products.....	\$36,918,521	\$36,915,361	\$3,160
				Contract work.....	\$3,143,903	\$3,132,283	\$11,620

¹ Includes products made by establishments in the following industries: Carpets and rugs, other than rag; carriages and wagons and materials; clothing, men's, including shirts; cotton goods, including cotton small wares; dyeing and finishing textiles; flour-mill and gristmill products; hats and caps, other than felt, straw, and wool; hats, fur-felt; hats, straw; hosiery and knit goods; millinery and lace goods; silk and silk goods, including throwsters; and waste.

² Includes products manufactured primarily in the following industries: Carpets and rugs, other than rag; clothing, horse; clothing, men's, including shirts; cotton goods, including cotton small wares; foundry and machine-shop products; hats, fur-felt; hats, straw; hosiery and knit goods; house-furnishing goods, not elsewhere specified; and leather goods.

Summary for the woolen goods and worsted goods branches of the industry.—Table 32 gives the quantity and value of the different products of the woolen goods and worsted goods branches of the industry for 1909, 1904, and 1899.

In comparing the percentages of increase (or decrease) in quantity shown in this table with those in value, it should be borne in mind that each of the separate classes of products listed includes a variety of grades and styles differing from one another in value. Consequently no definite conclusions as to changes in prices can be drawn from this comparison. A change in the relative importance of the different grades and styles within a given class might result in a greater average value per yard for the class as a whole at one census than at another, without any corresponding increase in the prices of any of the specific kinds of goods covered. In view of these conditions, the Census Bureau has not deemed it desirable to compute average values for any of the classes of products shown.

All-wool woven goods contributed somewhat over half (52.4 per cent) of the total value of products of the woolen and worsted mills in 1909; union or cotton-mixed woven goods contributed 3.4 per cent; cotton-warp woven goods, 14.8 per cent; upholstering goods, five-tenths of 1 per cent; yarn and other partly manu-

factured products made for sale, 27.4 per cent; and all other products, eight-tenths of 1 per cent.

The amount of duplication involved in the use of the products of one mill as material for others can not be accurately determined, as it is impossible to distinguish the materials purchased from other mills in the industry from similar materials purchased from abroad or from establishments in other industries. It is probable, however, that most of the woolen, worsted, and merino yarns purchased by the mills in the woolen industry are purchased from other mills in the same industry. The total cost of purchased yarns of these classes used in 1909 was \$56,910,427. A further duplication of several million dollars is undoubtedly involved in the use of purchased waste, noils, tops, etc.

In 1909 the establishments in the woolen goods and worsted goods branches of the industry produced 570,743,797 square yards of woven goods, exclusive of upholstery goods and sundries. To this total all-wool woven goods contributed 322,944,365 square yards, or 56.6 per cent; union or cotton-mixed woven goods, 37,453,351 square yards, or 6.6 per cent; and cotton-warp woven goods, 210,346,081 square yards, or 36.9 per cent.

The production of woven goods in 1904 (exclusive of upholstery goods and sundries) amounted to

Of the three main groups of woven goods the all wool group shows the highest rate of increase, the output having increased 49.3 per cent in quantity and 86.7 per cent in value from 1899 to 1909. The value of this class of goods constituted 74.2 per cent of the total for all woven goods in 1909, as compared with 64.2 per cent in 1899. Worsteds coatings, serges, suitings, overcoatings, cloakings, dress goods, cashmeres, and bunting together formed 70 per cent of the all-wool woven goods manufactured in 1909. The total number of square yards of these worsted fabrics manufactured in 1909 was a little more than double that in 1899.

The production of union or cotton-mixed goods in 1909 was much less than in 1904 or 1899. The production of "unions, tweeds, cheviots, cashmeres, etc.," which comprised more than half of the union or cotton-mixed woven goods produced, decreased 38.5 per cent during the decade. The output of overcoatings and that of cloakings of this class decreased 29.7 per cent, and sackings, tricots, dress goods, etc., decreased 61.4 per cent during this period. The production of flannels for underwear and cotton mixed blankets increased 13.6 per cent from 1899 to 1909, although there was a decrease between 1904 and 1909.

Cotton-warp woven goods show an increase from 1899 to 1909 of 57,467,497 square yards, or 37.6 per cent. The value of such goods reported was 21 per cent of the value of all woven goods (not including upholstery goods and sundries) in 1909 and 23.2 per cent in 1899. The production of wool filling overcoatings, cloakings, etc., however, shows a marked decrease, as does that of satinets and linseys. Blankets and horse blankets also show decreases in quantity during the decade. The production of linings, Italian cloths, etc., on the other hand, increased 184.8 per cent during the 10 years. The output of woolen and worsted upholstery goods in 1909 was more than twice as great as in 1899.

The yarns shown in Table 30 include only those produced for sale. The total quantity increased from 96,213,866 pounds in 1899 to 134,051,361 pounds in 1909, or 39.3 per cent. In 1909, worsted yarn formed 65.9 per cent of the total quantity, the output having increased 105.4 per cent during the decade, while the quantity of both woolen and merino yarns decreased.

Table 33 shows the quantity of all-wool, cotton-mixed, and cotton-warp fabrics produced in the woolen goods and worsted goods branches of the industry in 1909, 1904, and 1899.

PRODUCT.	PRODUCTION OF ALL-WOOL, COTTON-MIXED, AND COTTON-WARP FABRICS IN THE WOOLEN GOODS AND WORSTED GOODS BRANCHES OF THE WOOLEN INDUSTRY (SQUARE YARDS).				Per cent of increase: 1899-1909	PRODUCT.	PRODUCTION OF ALL-WOOL, COTTON-MIXED, AND COTTON-WARP FABRICS IN THE WOOLEN GOODS AND WORSTED GOODS BRANCHES OF THE WOOLEN INDUSTRY (SQUARE YARDS).				Per cent of increase: 1899-1909
	1909	1904	1899				1909	1904	1899		
Total production	571,350,648	508,013,537	426,949,136	33.8		Flannels for underwear—Contd.					
All wool.....	323,444,896	260,681,119	216,683,554	49.3		Per cent of total.....	100.0	100.0	100.0		
Union or cotton mixed....	37,453,351	63,197,407	57,334,570	-34.7		All wool.....	24.9	43.0	46.5		
Cotton warp.....	210,452,401	182,135,011	152,931,012	37.6		Union or cotton mixed....	45.6	35.9	30.9		
Per cent of total.....	100.0	100.0	100.0			Cotton warp.....	29.5	21.1	22.6		
All wool.....	56.6	51.5	50.8			Astrakhan (cotton warp).....	17,680	(³)	32,576	-45.7	
Union or cotton mixed....	6.6	12.5	13.4			Satinets and linseys (cotton warp).....	5,102,460	22,343,617	13,051,729	-60.9	
Cotton warp.....	36.8	36.0	35.8			Linings, Italian cloths, and lastings (cotton warp).....	28,928,148	17,619,325	10,157,039	184.8	
Cassimeres, tweeds, cheviots, etc., for men's wear	253,881,644	188,474,272	169,177,028	50.1		Blankets.....	17,209,353	19,869,262	18,155,505	-5.2	
All wool.....	160,499,048	102,080,377	88,584,945	81.2		All wool.....	5,638,434	7,414,563	5,465,277	3.2	
Union or cotton mixed....	18,917,478	35,103,110	30,767,915	-38.5		Union or cotton mixed....	1,717,758	3,114,110	1,530,696	12.2	
Cotton warp.....	74,465,118	51,290,785	49,824,168	49.5		Cotton warp.....	9,853,161	9,340,589	11,159,532	-11.7	
Per cent of total.....	100.0	100.0	100.0			Per cent of total.....	100.0	100.0	100.0		
All wool.....	63.2	54.2	52.4			All wool.....	32.7	37.3	30.1		
Union or cotton mixed....	7.5	18.6	18.2			Union or cotton mixed....	10.0	15.7	8.4		
Cotton warp.....	29.3	27.2	29.4			Cotton warp.....	57.3	47.0	61.5		
Overcoatings, cloakings, etc.	22,019,399	37,040,657	29,614,919	-25.6		Horse blankets.....	5,151,669	7,666,873	7,315,304	-29.6	
All wool.....	15,352,174	23,469,198	19,610,055	-21.7		All wool.....	247,395	740,237	518,452	-52.3	
Union or cotton mixed....	4,281,739	5,373,053	6,087,366	-29.7		Union or cotton mixed....	694,176	618,800	1,094,537	-36.5	
Cotton warp.....	2,385,486	8,198,406	3,917,498	-39.1		Cotton warp.....	4,210,098	6,307,836	5,702,315	-26.2	
Per cent of total.....	100.0	100.0	100.0			Per cent of total.....	100.0	100.0	100.0		
All wool.....	69.7	63.4	66.2			All wool.....	4.8	9.7	7.1		
Union or cotton mixed....	19.4	14.5	20.6			Union or cotton mixed....	13.5	8.1	15.0		
Cotton warp.....	10.8	22.1	13.2			Cotton warp.....	81.7	82.3	78.0		
Dress goods, sackings, tricots, etc.	217,627,885	188,717,073	155,767,439	39.7		Carriage robes.....	3,433,712	1,375,186	1,739,422	97.4	
All wool.....	135,279,305	115,586,884	91,309,778	48.2		All wool.....	85,179	42,187	28,979	193.9	
Union or cotton mixed....	4,319,539	11,690,740	11,176,752	-61.4		Union or cotton mixed....	459,089	23,833	460,210	-0.2	
Cotton warp.....	78,029,041	61,439,449	53,280,909	46.4		Cotton warp.....	2,889,444	1,309,166	1,250,233	131.1	
Per cent of total.....	100.0	100.0	100.0			Per cent of total.....	100.0	100.0	100.0		
All wool.....	62.2	61.2	58.6			All wool.....	2.5	3.1	1.7		
Union or cotton mixed....	2.0	6.2	7.2			Union or cotton mixed....	13.4	1.7	26.5		
Cotton warp.....	35.9	32.6	34.2			Cotton warp.....	84.1	95.2	71.9		
Carriage cloths (all wool)	1,782,855	1,741,765	1,220,408	46.1		Woven shawls (all wool).....	704,153	895,777	600,104	17.3	
Flannels for underwear	15,491,690	20,269,730	20,117,663	-23.0							
All wool.....	3,856,353	8,710,131	9,345,556	-58.7							
Union or cotton mixed....	7,063,572	7,273,761	6,217,094	13.6							
Cotton warp.....	4,571,765	4,285,838	4,555,013	0.4							

¹ A minus sign (-) denotes decrease.

² Includes domett flannels and shirtings.

³ Not reported.

The table also shows the percentage of the total quantity of the principal classes of fabrics which was reported as all-wool, cotton-mixed, and cotton-warp, respectively, and the percentage of increase in each case for the decade 1899-1909. Upholstery goods and sundries have not been included in this table, because these products were not classified according to character—whether all-wool or not. The "all-wool" classification is not intended to include fabrics having any admixture of cotton or other fiber (aside from animal hair) except such as may have been used to bring up a pattern or design. The "cotton-warp" classification includes goods woven with cotton weft on warp of woolen or worsted yarn, as well as goods woven on cotton warps, with weft partly or wholly of wool, worsted, or hair.

In the case of cassimeres, tweeds, chevots, etc., and of dress goods, sackings, tricots, etc., all-wool fabrics formed a larger proportion of the total in 1909 than in 1904 and 1899, while cotton-mixed fabrics formed a considerably smaller proportion. In the case of flannels for underwear, on the other hand, cotton-mixed goods constituted a much larger proportion in 1909 than at either of the preceding censuses and all-wool goods a smaller proportion.

Summary for the felt goods branch of the industry.—Table 34 shows the quantity and value of the principal products of the felt goods branch of the woolen industry for 1909, 1904, and 1899, together with the percentage of increase for the decade 1899-1909.

The value of products reported for this branch of the industry increased from \$6,461,691 in 1899 to \$11,852,626 in 1909, or 83.4 per cent, with especially large gains in both quantity and value of the products classified as trimming and lining felts, felt skirts, etc., and of hair felting.

Summary for the wool hat branch of the industry.—Table 35 presents statistics of the products of the wool hat branch of the industry for 1909, 1904, and 1899.

The total value of products for this branch of the industry shows an increase of 22 per cent for the decade 1899-1909. The number of wool-felt hats reported for 1909, though greater than that shown for 1904, was materially less than that for 1899.

PRODUCT.	1909	1904	1899	Percent of increase: ¹ 1899-1909
Total value	\$11,852,626	\$8,948,594	\$6,461,691	83.4
Felt cloths:				
Square yards.....	3,764,468	3,689,610	2,058,002	83.1
Value.....	\$1,381,854	\$1,830,627	\$548,543	151.9
Trimming and lining felts, felt skirts, etc.:				
Square yards.....	5,953,410			
Value.....	\$1,329,686	5,145,340	2,469,830	.....
Saddle felts:		\$1,188,908	\$796,718	.....
Pounds.....	1,650,991			
Value.....	\$575,849			
Endless belts:				
Pounds.....	3,243,034	1,770,124	2,114,357	(²)
Value.....	\$3,417,822	\$1,707,216	\$1,084,835	215.1
Boot and shoe linings:				
Square yards.....	1,661,090	2,823,137	1,052,538	57.8
Value.....	\$514,456	\$781,450	\$540,110	-5.8
Hair felting:				
Square yards.....	1,159,999	605,214	125,000	828.0
Value.....	\$331,045	\$191,998	\$56,950	832.5
All other felts.....	\$3,549,876	\$2,592,894	\$2,261,918	(²)
All other products.....	\$552,038	\$655,501	\$1,172,617	-52.9

¹ A minus sign (—) denotes decrease.

² Square yards.

³ Comparable figures not available.

PRODUCT.	1909	1904	1899	Percent of increase: ¹ 1899-1909
Total value	² \$4,382,411	\$2,457,268	\$3,591,940	22.0
Wool-felt hats:				
Dozens.....	590,957	446,121	811,425	-27.2
Value.....	\$3,646,787	\$2,290,070	\$3,161,361	15.4
Wool-felt hat bodies and hats in the rough:				
Dozens.....	53,896	18,587	56,006	-3.8
Value.....	\$309,492	\$100,491	\$120,262	157.3
All other products.....	\$426,132	\$66,705	\$310,317	37.3

¹ A minus sign (—) denotes decrease.

² In addition, 67,571 dozen wool-felt hats, valued at \$904,643, were made by establishments engaged primarily in other industries.

Total production of yarns and shoddy in the woolen industry (exclusive of carpets and rugs).—The total production of yarns and of shoddy, mungo, and wool extract in the four branches of the industry combined in 1909 is given in Table 36, the figures covering stock made for use in further processes of manufacture in the same mill, as well as that made for sale.

PRODUCT.	Total.	For sale.	For use in the same establishment.			
			Total.	Made in woolen mills.	Made in worsted mills.	Made in felt mills.
Yarns	345,890,979	134,051,361	211,839,618	116,623,156	90,742,195	4,574,287
Woolen.....	124,568,522	28,520,493	96,048,029	80,761,458	10,743,304	4,543,267
Worsted.....	168,748,960	¹ 89,193,920	79,555,040	3,097,658	76,457,382	.....
Merino.....	45,330,262	14,011,362	31,318,900	30,124,141	1,163,759	31,000
Cotton.....	7,343,235	2,325,586	5,017,649	2,639,899	2,377,750	.....
Shoddy, mungo, and wool extract	33,378,690	437,057	32,941,638	31,021,323	1,045,310	875,000

¹ Includes 869,967 pounds of mehair yarn.

Of the total number of square yards of all-wool woven goods, Massachusetts produced 33.8 per cent in 1909, Rhode Island 16.6 per cent, and Pennsylvania 10.2 per cent, these proportions differing but little from those in 1899. In the total production of union or cotton-mixed goods also Massachusetts ranked first in 1909, while Pennsylvania ranked second and Maine third. Of the total quantity of cotton-warp goods, Massachusetts reported 49.6 per cent in 1909, as compared with 36.1 per cent in 1899, Pennsylvania and Rhode Island ranking second and third, respectively, at both censuses.

Pennsylvania reported 51.3 per cent of the total production of wool-felt hats in 1909, and ranked first also in the quantity of yarns made for sale, with 50.2 per cent of the total for the United States.

EQUIPMENT.

Summary for the United States.—Table 38 shows the number of sets of woolen cards and the number of combing machines, spindles, and looms used in the woolen industry, as reported at the censuses of 1909, 1904, and 1899.

	EQUIPMENT USED IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).					
	Number.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Woolen cards (sets) ² ...	5,099	5,753	6,137	-16.9	-11.4	-6.3
Combing machines.....	1,978	1,440	1,317	50.2	37.4	9.3
Spindles.....	4,317,993	3,765,751	3,301,893	30.8	14.7	14.0
Looms ³	72,940	64,132	61,537	18.5	13.7	4.2

¹ A minus sign (-) denotes decrease. ² Includes shoddy cards.

³ Exclusive of carpet looms.

The number of sets of woolen cards decreased steadily between 1899 and 1909, this decrease resulting in part from the relative decline in the carded-woolen branch of the industry. The growth of the worsted branch is indicated by the increase of 50.2 per cent during the decade in the number of combing machines. The increase in the number of spindles between 1899 and 1909 was 30.8 per cent, and in the number of looms 18.5 per cent.

Sets of cards.—Table 39 gives for the United States, and for each of the leading states, the number of sets of woolen cards used in 1909 and 1904.

With the woolen cards, as given in the table, are included the shoddy cards which were in operation in the various mills manufacturing woolen, worsted, and felt goods, and wool hats. The decrease in the number of sets of woolen cards, including such shoddy cards, was 654, or 11.4 per cent. It must be remembered, however, that the card is not in any case an absolutely accurate standard, because of variations in the

width of the cards, the diameter of the cylinders, and the speed at which they are operated.

STATE AND YEAR.	Sets of woolen cards used in the woolen industry (exclusive of carpets and rugs). ¹	STATE AND YEAR.	Sets of woolen cards used in the woolen industry (exclusive of carpets and rugs). ¹
United States:		New York:	
1909.....	5,099	1909.....	364
1904.....	5,753	1904.....	452
Connecticut:		Pennsylvania:	
1909.....	408	1909.....	840
1904.....	442	1904.....	856
Maine:		Rhode Island:	
1909.....	441	1909.....	305
1904.....	456	1904.....	360
Massachusetts:		Wisconsin:	
1909.....	1,403	1909.....	84
1904.....	1,587	1904.....	78
New Hampshire:		All other states:	
1909.....	357	1909.....	766
1904.....	393	1904.....	950
New Jersey:			
1909.....	131		
1904.....	179		

¹ Includes shoddy cards.

Table 40 shows the number of sets of cards reported in 1909, 1904, and 1899, classified according to width.

CLASS.	SETS OF WOOLEN CARDS USED IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS). ¹		
	1909	1904	1899
Total number.....	5,099	5,753	6,498
Classified according to width:			
24 inches.....	92	85	290
30 inches.....	28	53	126
36 inches.....	26	32	56
40 inches.....	702	1,118	1,176
42 inches.....	9	12	23
44 inches.....	108	140	133
46 inches.....		16	67
48 inches.....	2,624	2,806	3,372
54 inches.....	8	9	22
60 inches.....	1,320	1,287	1,136
72 inches.....	53	51	29
All other (including unspecified).....	129	144	68

¹ Includes shoddy cards.

² Does not include sets of cards for which the width was not reported, but includes cards used in the carpet and rug industry.

The decrease which has already been spoken of took place principally among the narrower cards, those 60 and 72 inches in width showing an increase. The decrease in capacity, therefore, was not as great as would be inferred from the decrease in the number of sets of cards.

Table 41 shows, by states, for 1909, the distribution of woolen cards according to width.

The 40, 48, and 60 inch cards are the most important, representing over 90 per cent of the total number of sets. Of these, the 48-inch cards are by far the most generally used, forming 51.4 per cent of the entire number in 1909. Pennsylvania is the only state of importance in the industry in which more 60-inch cards were used than 48-inch.

Table 41

STATE.	SETS OF WOOLEN CARDS USED IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS): 1909											
	Total.	24-inch.	30-inch.	36-inch.	40-inch.	42-inch.	44-inch.	48-inch.	54-inch.	60-inch.	72-inch.	All other widths.
United States.....	5,099	92	28	28	702	9	109	2,924	8	1,320	53	128
Connecticut.....	408				76		14	260		41	14	3
Maine.....	441	7	3	3	66		14	285	2	54		7
Massachusetts.....	1,403	28		12	270	4	65	706		259	27	32
New Hampshire.....	357	2			146			197		7		5
New Jersey.....	131							78		50	1	2
New York.....	364		1	2	34	1	2	213		56	10	45
Pennsylvania.....	840	39	2	1	7		2	274		503		12
Rhode Island.....	305				4			234	6	61		
Wisconsin.....	84	3	1	4	18			44		7		7
All other states.....	766	13	21	4	81	4	11	333		282	1	16

Combing machines.—Table 42 shows the distribution of the wool-combing machines by states for 1909, 1904, and 1899.

Table 42

STATE.	COMBING MACHINES USED IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).					
	Number.			Per cent distribution.		
	1909	1904	1899	1909	1904	1899
United States.....	1,878	1,440	1,317	100.0	100.0	100.0
Connecticut.....	33	18	40	1.7	1.2	3.0
Maine.....	29	26	19	1.5	1.8	1.4
Massachusetts.....	657	450	377	33.0	31.2	28.6
New Hampshire.....	52	24	34	2.6	1.7	2.6
New Jersey.....	265	166	125	13.3	11.5	9.5
New York.....	89	62	66	4.5	4.3	5.0
Pennsylvania.....	342	349	340	17.2	24.2	25.8
Rhode Island.....	461	291	287	23.2	20.2	21.8
Wisconsin.....	13	8	(1)	0.7	0.6	.....
All other states.....	37	46	29	2.4	3.2	2.2

¹ Included under "all other states."

Massachusetts at all three censuses reported more combing machines than any other state, and shows the greatest absolute increase during the decade 1899-1909, reporting 657 machines in 1909 as compared with 377 in 1899. Pennsylvania ranked second in 1904 and 1899 in the number of combing machines reported, but was outranked by Rhode Island in 1909, the latter state reporting 23.2 per cent of the total in that year as compared with 21.8 per cent in 1899. New Jersey reported 13.3 per cent of the combing machines used in the industry in 1909, as compared with 9.5 per cent in 1899, and shows the greatest relative increase for the decade, 112 per cent.

Table 43 shows the number of combing machines of domestic manufacture and of foreign manufacture, respectively, for the two branches of the industry in which these machines are used.

The proportion of combing machines of American manufacture has decreased somewhat since 1899, such

machines forming 22.1 per cent of the total in that year and only 20.3 per cent in 1909.

Table 43

CLASS.	COMBING MACHINES USED IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).		
	1909	1904	1899
Total.....	1,978	1,440	1,317
Of domestic manufacture.....	402	340	291
Per cent of total.....	20.3	23.6	22.1
Of foreign manufacture.....	1,576	1,100	1,026
Per cent of total.....	79.7	76.4	77.9
In worsted mills.....	1,925	1,312	1,194
Of domestic manufacture.....	370	259	214
Of foreign manufacture.....	1,555	1,053	980
In woolen mills.....	53	128	123
Of domestic manufacture.....	32	81	77
Of foreign manufacture.....	21	47	46

Spindles.—Table 44 gives the number of spindles used in the woolen industry as reported for 1909, 1904, and 1899, with separate figures for producing spindles (mule and frame) and doubling and twisting spindles employed, respectively, upon woolen, worsted, and cotton yarns.

As a standard of capacity the spindle is not altogether satisfactory, as the output of a spindle varies with the kind and size of yarn spun. The number of spindles, however, serves as a rough measure of the growth of the industry.

The total number of spindles of all kinds was 3,301,893 in 1899 and 4,317,993 in 1909, an increase of 1,016,100, or 30.8 per cent. The percentage of increase in producing spindles was somewhat lower. The increase was practically all in worsted spindles, as there was a decline during the decade in the number of woolen and cotton producing spindles, and but a small increase in the number of woolen and cotton doubling and twisting spindles.

The number of mule spindles declined between the censuses of 1904 and 1909, 7.7, per cent, but the number of frame spindles increased 62.1 per cent and was more than half as great as that of mule spindles in 1909.

The number of doubling and twisting spindles increased from 405,130 in 1899 to 735,336 in 1909, or 81.5 per cent. Since a large number of doubling and twisting spindles implies a greater use of 2-ply yarns and a higher grade of manufacture, the ratio of doubling and twisting spindles to producing spindles is of interest. For woolen spindles the ratio was 1 to 16.8 in 1909, as compared with 1 to 19.1 in 1904 and 1 to 20.3 in 1899. In the case of worsted spindles the ratio was 1 to 2.7 in 1909 and 1904, and 1 to 2.9 in 1899.

The total number of looms in the industry increased from 61,537 in 1899 to 72,940 in 1909, or 18.5 per cent. The broad looms (that is, those with 50 inches or more of reed space) increased in number 15,633, or 40.9 per cent, while in the number of narrow looms there was a decrease of 4,237, or 18.2 per cent. Of the states listed in the table, New Jersey shows the highest rate of increase in the total number of looms (89.1 per cent).

Table 46 gives for 1909, 1904, and 1899 the number of looms employed on woolen goods and on worsted goods, respectively, classified as broad looms, narrow looms, and hand looms.

CLASS.	LOOMS USED IN THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).		
	1909	1904	1899
Total	72,940	64,132	61,537
Broad looms: ¹			
On woolen goods.....	24,956	26,493	21,567
On worsted goods.....	28,796	19,595	16,693
Narrow looms: ²			
On woolen goods.....	8,117	10,107	13,618
On worsted goods.....	10,680	7,871	9,625
Hand looms	41	66	34

¹ Fifty inches reed space or over.

² Under 50 inches reed space.

The number of narrow looms employed in weaving woolen goods decreased between 1899 and 1909, while the number employed in weaving worsted goods increased. The number of broad looms on both woolen

and worsted goods shows an increase for the decade, the greatest gain being in the number of broad looms used in weaving worsted goods.

Table 47 gives, by states, the number of pickers and garnet machines used in the industry in 1909 and 1904.

STATE.	Census.	THE WOOLEN INDUSTRY (EXCLUSIVE OF CARPETS AND RUGS).	
		Number of pickers.	Number of garnet machines.
United States	1909	1,425	224
	1904	1,733	227
Connecticut	1909	100	18
	1904	124	16
Maine	1909	105	18
	1904	135	17
Massachusetts	1909	370	45
	1904	404	34
New Hampshire	1909	98	12
	1904	127	17
New Jersey	1909	59	1
	1904	71	3
New York	1909	73	20
	1904	92	18
Pennsylvania	1909	242	44
	1904	293	53
Rhode Island	1909	72	15
	1904	94	24
Wisconsin	1909	35	8
	1904	32	6
All other states	1909	271	43
	1904	361	39

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the four branches of the woolen industry are presented, by states, in Tables 48 and 49.

Table 48 shows for 1909, 1904, and 1899 the number of establishments, number of persons engaged in the

industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 49 gives more detailed statistics for the industry for 1909 only.

THE CARPET AND RUG INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—This section of the report covers the operations of establishments which manufacture woven carpets and rugs from materials other than rags. The formal designation of the industry is "carpets and rugs, other than rag," the manufacture of rag carpets (as a primary product) being treated as a separate industry.

Although the most important material of the carpet and rug industry is wool, and the machinery employed is similar in general character to that used in the manufacture of other woolen products, this industry has been given a separate classification because of the importance and the distinctive characteristics of the carpet mills and their products. For purposes of comparison with previous censuses, the combined totals for the wool industry proper and the carpet and rug

industry are given in the preceding section on wool manufactures.

Comparative summary for the United States.—At the census of 1849, 116 establishments were reported as engaged in the manufacture of carpets and rugs, these establishments giving employment to an average of 6,186 hands and manufacturing products valued at \$5,401,234. At the census of 1859, 213 establishments were reported, giving employment to an average of 6,681 hands and manufacturing products to the value of \$7,857,636. Table 50 summarizes the statistics of the industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, the financial figures for that year should be reduced about 20 per cent.

Table 50

	THE CARPET AND RUG INDUSTRY.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	139	139	133	173	195	215	4.5	.....	4.5	-23.1	-11.3	-9.3
Persons engaged in the industry...	34,706	34,393	29,209	(²)	(²)	(²)	18.8	0.9	17.7	.....	.....	.....
Proprietors and firm members.....	134	149	111	(²)	(²)	(²)	20.7	-10.1	34.2	.....	.....	.....
Salaried employees.....	1,265	1,023	687	(²)	(²)	(²)	84.1	23.7	48.9	.....	.....	.....
Wage earners (average number).....	33,307	33,221	28,411	28,736	20,371	12,098	17.2	0.3	16.9	(³)	(³)	(³)
Primary horsepower.....	38,553	33,945	26,740	22,684	10,491	3,719	44.2	13.6	26.9	17.9	116.2	182.1
Capital.....	\$75,627,010	\$56,781,074	\$44,449,299	\$38,208,842	\$21,468,587	\$12,540,750	70.1	33.2	27.7	16.3	78.0	71.2
Expenses.....	62,311,110	57,231,024	41,983,379	42,097,462	(²)	(²)	48.4	8.9	36.3	-0.3	.....	.....
Services.....	17,745,092	15,120,924	12,002,781	11,633,116	6,835,218	4,681,718	47.8	17.4	26.0	3.2	70.2	46.0
Salaries.....	2,209,042	1,396,691	881,398	(²)	(²)	(²)	150.6	58.2	58.5	.....	.....	.....
Wages.....	15,536,050	13,724,233	11,121,383	(²)	(²)	(²)	39.7	13.2	23.4	.....	.....	.....
Materials.....	39,563,004	37,947,954	27,228,719	28,644,905	18,984,877	13,577,993	45.3	4.3	39.4	-4.9	50.9	39.8
Miscellaneous.....	5,003,014	4,162,146	2,751,879	1,819,441	(²)	(²)	81.8	20.2	51.2	51.3	.....	.....
Value of products.....	71,188,152	61,586,433	48,192,351	47,770,193	31,792,802	21,761,573	47.7	15.6	27.8	0.9	50.3	46.1
Value added by manufacture (value of products less cost of materials).....	31,625,148	23,638,479	20,963,632	19,125,288	12,807,925	8,183,580	50.9	33.8	12.8	9.6	49.3	56.5

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available. ³ Figures not strictly comparable.

The number of wage earners employed in this industry in 1909 was nearly three times the number in 1869, and the value of products in the later year was more than three times as great as that in the earlier. The number of establishments, however, decreased gradually from 1869 to 1899, although increasing slightly between 1899 and 1904, and the increase in the number of wage earners in the latter part of the period covered by the table was not very great, a decrease occurring during the decade 1889-1899, while the increase for the last five-year period, 1904-1909, was only three-tenths of 1 per cent. The greatest relative increase in value of products shown for any decade is that for the decade 1879-1889 (50.3 per cent), although the increases for the decades 1899-1909 and 1869-1879 were nearly as

large. For the decade 1899-1909 the increase in the number of wage earners was 17.2 per cent; in the amount of wages paid, 39.7 per cent; in the cost of materials, 45.3 per cent; and in value of products, 47.7 per cent. Some part, however, of the increase in cost of materials and value of products was due to the general advance in prices which took place during the decade. Both the cost of materials and the value of products involve some duplication, due to the sale of yarns by some carpet and rug mills to other establishments in the industry, but the amount of such duplication is relatively small, since the bulk of the yarns purchased by the carpet and rug mills are produced by mills in the woolen industry. The value of the yarn made for sale in 1909 by carpet and rug mills was only \$732,846.

Summary, by states.—Table 51 summarizes, by states, the more important statistics of the industry, the states being arranged according to the value of products reported for 1909. Connecticut, which state

ranked fourth both in 1909 and 1904 in number of wage earners, value of products, and value added by manufacture, is included under "all other states" in order to avoid the disclosure of individual operations.

Table 51

THE CARPET AND RUG INDUSTRY.																			
STATE.	Number of establishments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.		
											1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States	139	33,307	100.0		\$71,188,152	100.0		\$31,625,148	100.0		17.2	0.3	16.9	47.7	15.8	27.8	50.9	33.8	12.8
New York	16	11,898	35.7	1	25,606,262	36.0	1	12,291,090	38.9	1	38.3	7.4	28.8	70.4	32.0	29.1	67.3	48.6	12.6
Pennsylvania	93	11,510	34.6	2	24,879,232	34.9	2	10,230,934	32.4	2	-10.9	-16.1	8.2	7.6	-8.3	17.3	9.6	-1.8	11.5
Massachusetts	11	5,954	17.9	3	12,811,981	18.0	3	5,310,871	16.8	3	32.9	16.0	15.6	83.9	31.9	39.4	78.5	70.4	1.2
New Jersey	9	884	2.7	5	1,945,217	2.7	5	1,047,702	3.3	5	-24.5	-23.3	-1.6	27.7	11.2	14.8	59.8	36.0	17.6
All other states	10	3,061	9.2		6,945,460	8.4		2,744,551	8.7										

¹ Percentages are based on figures in Table 75. A minus sign (-) denotes decrease.

Carpet and rug factories were reported from only 11 states in 1909. New York ranked first at the census of 1909 in the average number of wage earners employed in the industry, in value of products, and in value added by manufacture, having advanced from second place since 1904; the value of products reported for this state in 1909 represented 36 per cent of the total value of products for the industry in the United States. The number of wage earners in New York increased 38.3 per cent between 1899 and 1909, and the value of products 70.4 per cent. Pennsylvania, which ranked first among the states in 1904 in all three items, was second in 1909, contributing 34.9 per cent of the total value of products for the industry. Massachusetts, which ranked third in all three items in both 1909 and 1904, shows a greater percentage of increase in value of products for the decade than either New York or Pennsylvania, the gain being 83.9 per cent.

Persons engaged in the industry.—Table 52 shows, for 1909, the number of persons engaged in the carpet and rug industry, classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and in other tables is an estimate obtained by the method described in the Introduction.

Table 52

CLASS.	PERSONS ENGAGED IN THE CARPET AND RUG INDUSTRY: 1909		
	Total.	Male.	Female.
All classes	34,706	20,725	13,981
Proprietors and officials	448	444	4
Proprietors and firm members	134	134	2
Salaried officers of corporations	115	113	2
Superintendents and managers	199	187	2
Clerks	951	801	150
Wage earners (average number)	33,307	19,480	13,827
16 years of age and over	31,956	18,720	13,236
Under 16 years of age	1,351	760	591

The average number of persons engaged in the industry during 1909 was 34,706, of whom 33,307, or 96

per cent, were wage earners, 448, or 1.3 per cent, proprietors and officials, and 951, or 2.7 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 20,725, or 59.7 per cent, were males, and 13,981, or 40.3 per cent, females. The average number of children under 16 years of age employed as wage earners was 1,351, or 3.9 per cent of the total number of persons engaged in the industry.

The average number of wage earners employed in each state in 1909, 1904, and 1899 is given in Table 75. The average number distributed by sex and age is not shown for the individual states, but Table 76 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported as employed in nine states, the largest number, 5,406, being reported for New York, and the next largest number, 4,354, for Pennsylvania. The employment of children under 16 years of age was practically confined to five states; the largest number, 639, was reported for Pennsylvania, and the next largest, 366, for Massachusetts.

In order to compare the distribution of the persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 53.

Table 53

CLASS.	PERSONS ENGAGED IN THE CARPET AND RUG INDUSTRY.				
	1909		1904		Per cent of increase: ¹ 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total	34,706	100.0	34,393	100.0	0.9
Proprietors and firm members	134	0.4	149	0.4	-10.1
Salaried employees	1,265	3.6	1,023	3.0	23.7
Wage earners (average number)	33,307	96.0	33,221	96.6	0.3

¹A minus sign (-) denotes decrease.

Table 54 shows the average number of wage earners in the carpet and rug industry distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

CLASS.	1909		1904		1899	
	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.
Total.....	33,307	100.0	33,221	100.0	28,411	100.0
16 years of age and over.....	31,956	95.9	31,338	94.3	26,328	92.7
Male.....	18,720	56.2	16,930	51.0	13,860	48.8
Female.....	13,236	39.7	14,408	43.4	12,468	43.9
Under 16 years of age.....	1,351	4.1	1,883	5.7	2,083	7.3

While the figures indicate that there has been a gradual increase in the relative number of men and a corresponding decrease in the number of women employed in the industry, the most noticeable fact

brought out by the table is the decrease from census to census in the absolute number of children employed.

Wage earners classified according to nature of employment.—Table 55 gives the total number of wage earners employed as spinners, as weavers, and in all other capacities, in the carpet and rug industry classified according to age and sex for 1909 and 1904, together with similar statistics for 1909 only for selected states.

The total number of wage earners employed on December 15 (or the nearest representative day) in 1909 was 34,874, of whom 3.3 per cent were spinners and 30.9 per cent weavers. The corresponding percentages for 1904 were 4.9 and 36.6 per cent, respectively. Both spinners and weavers declined in absolute number as well as in their proportion of the total, some part of the decline probably being attributable to the improvement of carpet and rug making machinery.

CLASS.	Total.	Spinners.		Weavers.		All other.	
		Num-ber.	Per cent of total.	Num-ber.	Per cent of total.	Num-ber.	Per cent of total.
United States:							
1909.....	34,874	1,138	3.3	10,778	30.9	22,957	65.8
1904.....	33,221	1,621	4.9	12,154	36.6	19,446	58.5
16 years and over:							
1909.....	33,460	1,062	3.2	10,755	32.1	21,643	64.7
1904.....	31,338	1,467	4.7	12,105	38.6	17,766	56.7
Male—							
1909.....	19,601	511	2.6	6,986	35.4	12,154	62.0
1904.....	16,930	531	3.1	7,055	41.7	9,344	55.2
Female—							
1909.....	13,859	551	4.0	3,819	27.6	9,489	68.5
1904.....	14,408	936	6.5	5,050	35.0	8,422	58.5
Under 16 years:							
1909.....	1,414	76	5.4	24	1.7	1,314	92.9
1904.....	1,883	154	8.2	49	2.6	1,680	89.2
Male, 1909.....	796	35	4.4	—	—	761	95.6
Female, 1909.....	618	41	6.6	24	3.9	553	89.5
Selected states, 1909:							
Massachusetts.....	6,087	237	3.9	1,233	20.3	4,617	75.8
16 years and over.....	5,721	207	3.6	1,231	21.5	4,283	74.9
Male.....	3,155	75	2.4	553	17.5	2,527	80.1
Female.....	2,566	132	5.1	678	26.4	1,756	68.4
Under 16 years.....	366	30	8.2	2	0.5	334	91.3
Male.....	213	10	4.7	—	—	203	95.3
Female.....	153	20	13.1	2	1.3	131	85.6

¹ For 1909 the figures are those reported for December 15, or the nearest representative day; for 1904 the average number is given.

Table 56 shows the percentage of men, women, and children, respectively, in the total number of wage earners employed in the industry and in each of the three classes for which statistics are presented in Table 55, together with similar statistics for 1909 only for selected states.

CLASS.	Total.	Spinners.		Weavers.		All other.	
		Num-ber.	Per cent of total.	Num-ber.	Per cent of total.	Num-ber.	Per cent of total.
Selected states, 1909—							
Continued.							
New Jersey.....	1,008	27	2.7	297	29.5	684	67.9
16 years and over.....	991	27	2.7	297	30.0	667	67.3
Male.....	697	19	2.7	254	36.4	424	60.8
Female.....	294	8	2.7	43	14.6	243	82.7
Under 16 years.....	17	—	—	—	—	17	100.0
Male.....	15	—	—	—	—	15	100.0
Female.....	2	—	—	—	—	2	100.0
New York.....	12,192	535	4.4	2,912	23.9	8,745	71.7
16 years and over.....	12,114	526	4.3	2,912	24.0	8,676	71.6
Male.....	6,708	242	3.6	1,390	20.7	5,076	75.7
Female.....	5,406	284	5.3	1,522	28.2	3,600	66.6
Under 16 years.....	78	9	11.5	—	—	69	88.5
Male.....	51	1	2.0	—	—	50	98.0
Female.....	27	8	29.6	—	—	19	70.4
Pennsylvania.....	12,454	232	1.9	5,705	45.8	6,517	52.3
16 years and over.....	11,815	195	1.7	5,683	48.1	5,937	50.2
Male.....	7,461	131	1.8	4,324	58.0	3,006	40.3
Female.....	4,354	64	1.5	1,359	31.2	2,931	67.3
Under 16 years.....	639	37	5.8	22	3.4	580	90.8
Male.....	342	24	7.0	—	—	318	93.0
Female.....	297	13	4.4	22	7.4	262	88.2

In Massachusetts and New York more than half of the spinners and weavers were women, while in New Jersey and Pennsylvania men were largely in the majority. In Massachusetts and Pennsylvania children constituted a considerable proportion of the spinners and of "all other" wage earners.

CLASS.	WAGE EARNERS EMPLOYED IN THE CARPET AND RUG INDUSTRY—PER CENT OF TOTAL.			CLASS.	WAGE EARNERS EMPLOYED IN THE CARPET AND RUG INDUSTRY—PER CENT OF TOTAL.		
	16 years and over.		Under 16 years.		16 years and over.		Under 16 years.
	Male.	Female.			Male.	Female.	
United States:							
1909.....	58.2	39.7	4.1				
1904.....	51.0	43.4	5.7				
SpINNERS:							
1909.....	62.5	36.7	0.8				
1904.....	55.1	43.5	1.5				
Weavers:							
1909.....	64.3	35.4	0.2				
1904.....	58.0	41.6	0.4				
All other:							
1909.....	52.9	41.3	6.7				
1904.....	47.0	42.3	8.6				
Selected states, 1909:							
Massachusetts:							
All wage earners.....	51.8	42.2	6.0				
SpINNERS.....	31.6	55.7	12.7				
Weavers.....	44.8	55.0	0.2				
All other.....	54.7	38.0	7.2				
				Selected states, 1909—Continued.			
				New Jersey:			
				All wage earners.....	69.1	29.2	1.7
				SpINNERS.....	70.4	29.6	.....
				Weavers.....	85.6	14.5	.....
				All other.....	62.0	35.5	2.5
				New York:			
				All wage earners.....	55.0	44.3	0.6
				SpINNERS.....	45.2	53.1	1.7
				Weavers.....	47.7	52.3	.....
				All other.....	58.0	41.2	0.8
				Pennsylvania:			
				All wage earners.....	59.9	35.0	5.1
				SpINNERS.....	56.5	27.6	15.9
				Weavers.....	75.8	23.8	0.4
				All other.....	46.1	45.0	8.9

Wage earners employed, by months.—Table 57 gives the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 for the five states in which an average of 500 or more wage earners were employed during the year.

STATE.	Average number during the year.	WAGE EARNERS EMPLOYED IN THE CARPET AND RUG INDUSTRY: 1909 ¹											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	33,307	33,312	33,603	33,313	32,719	32,835	33,186	33,297	33,387	33,482	33,082	33,397	34,097
Connecticut.....	2,999	2,971	2,978	2,978	2,940	2,939	2,933	3,014	3,029	3,029	3,041	3,086	3,065
Massachusetts.....	5,954	6,037	6,102	5,977	5,855	5,927	5,880	5,974	5,888	5,930	5,898	5,893	6,087
New Jersey.....	884	902	940	925	824	867	779	833	898	865	853	914	1,008
New York.....	11,898	11,570	11,654	11,794	11,804	11,747	11,859	11,952	12,007	12,015	12,032	12,154	12,192
Pennsylvania.....	11,510	11,778	11,875	11,581	11,238	11,292	11,672	11,460	11,500	11,558	11,189	11,300	11,677

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed during any month of 1909 was 34,097, in December, and the smallest number, 32,719, in April, the minimum number being equal to 96 per cent of the maximum. In 1904 the maximum number, 34,514, was shown for February, and the minimum number, 31,570, for September, the latter number being equal to 91.5 per cent of the former. In New York and New Jersey the month of maximum employment in 1909 was December; in Connecticut, November; and in Pennsylvania and Massachusetts, February.

Prevailing hours of labor.—In Table 58 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Only 1 per cent of the wage earners employed in 1909 were in establishments where the prevailing number of hours was less than 54 per week, and none were in establishments where the prevailing hours

were over 60 per week. In Massachusetts and New Jersey the most common working time was between 54 and 60 hours per week; in New York, 54 hours; and in Pennsylvania, 60 hours. In Connecticut all the wage earners were reported as employed in establishments where the prevailing hours of work were between 54 and 60 per week.

STATE.	AVERAGE NUMBER OF WAGE EARNERS IN THE CARPET AND RUG INDUSTRY: 1909					
	Total.	In establishments with prevailing hours—				
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.
United States	33,307	165	178	7,078	13,802	12,084
Connecticut.....	2,999	.....	.....	.....	2,999	.....
Massachusetts.....	5,954	45	.....	.....	5,909	.....
New Jersey.....	884	36	3	.....	845	.....
New York.....	11,898	124	.....	6,463	742	4,569
Pennsylvania.....	11,510	129	.....	615	3,267	7,499

Character of ownership.—Table 59 presents statistics with respect to the character of ownership of the establishments in the carpet and rug industry for 1909 and 1904.

CHARACTER OF OWNERSHIP.	THE CARPET AND RUG INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	139	139	\$71,188,152	\$61,686,433
Individual.....	45	44	7,073,752	7,919,719
Firm.....	37	46	17,215,357	17,690,846
Corporation.....	57	49	46,899,043	35,975,868
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	32.4	31.7	9.9	12.9
Firm.....	26.6	33.1	24.2	28.7
Corporation.....	41.0	35.3	65.9	58.4

In 1909, of the total number of establishments, 41 per cent were under corporate ownership, as compared with 35.2 per cent in 1904. In 1909 the value of products of these establishments, however, represented 65.9 per cent of the total for the industry, and 58.4 per cent in 1904.

Of the total number of wage earners reported for 1909, 2,546, or 7.6 per cent, were employed in establishments under individual ownership; 8,879, or 26.7 per cent, in those under firm ownership; and 21,882, or 65.7 per cent, in those owned by corporations.

Size of establishments.—Table 60 presents statistics for 1909 and 1904 for the establishments in the industry grouped according to the value of their products.

Of the 139 establishments reported for 1909 and 1904, only 16 manufactured products valued at \$1,000,000 and over; but these reported 71.7 per cent of the total value of products in 1909 and 62.8 per cent in 1904.

Establishments manufacturing products valued at less than \$20,000 constituted more than one-sixth (17.2 per cent) of the total number of mills in 1909, but the value of their products amounted to only two-tenths of 1 per cent of the total.

The average value of products per establishment

increased from \$443,068 in 1904 to \$512,145 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$170,061 to \$227,519. The average number of wage earners per establishment was 239 in 1904 and 240 in 1909.

VALUE OF PRODUCTS PER ESTABLISHMENT.	THE CARPET AND RUG INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	139	139	\$71,188,152	\$61,686,433
Less than \$5,000.....	12	6	30,390	15,398
\$5,000 and less than \$20,000.....	12	6	134,346	61,527
\$20,000 and less than \$100,000.....	43	46	2,217,254	2,717,194
\$100,000 and less than \$1,000,000.....	56	65	17,772,495	20,101,544
\$1,000,000 and over.....	16	16	51,033,667	38,690,770
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	8.6	4.3	(¹)	(¹)
\$5,000 and less than \$20,000.....	8.6	4.3	0.2	0.1
\$20,000 and less than \$100,000.....	30.9	33.1	3.1	4.4
\$100,000 and less than \$1,000,000.....	40.3	46.8	25.0	32.6
\$1,000,000 and over.....	11.5	11.5	71.7	62.8

¹ Less than one-tenth of 1 per cent.

Table 61 classifies the establishments in the carpet and rug industry in the five leading states according to the number of wage earners employed.

Of the 139 establishments reported in 1909, 4.3 per cent employed no wage earners, 27.3 per cent employed from 1 to 20 wage earners, 38.1 per cent from 21 to 100, 20.1 per cent from 101 to 500, and 10.1 per cent more than 500.

Of the total number of wage earners, 3.9 per cent were reported by establishments employing from 1 to 50 wage earners, 13.3 per cent by establishments employing from 51 to 250, 24.2 per cent by establishments employing from 251 to 1,000, and 58.6 per cent by those employing more than 1,000 wage earners. In New York 83.9 per cent of the wage earners were reported by establishments employing more than 1,000 wage earners.

STATE.	THE CARPET AND RUG INDUSTRY.																		
	Total.		Establishments employing in 1909—																
	Es- tab- lish- ments.	Wage earners (average number).	No wage earn- ers.	1 to 5 wage earn- ers.	6 to 20 wage earn- ers.	21 to 50 wage earn- ers.	51 to 100 wage earn- ers.	101 to 250 wage earn- ers.	251 to 500 wage earn- ers.	501 to 1,000 wage earn- ers.	Over 1,000 wage earn- ers.	Es- tab- lish- ments.	Wage earners.	Es- tab- lish- ments.	Wage earners.	Es- tab- lish- ments.	Wage earners.		
United States	139	33,307	6	10	21	28	357	27	923	26	2,025	16	2,418	12	4,144	6	3,906	8	19,515
Connecticut.....	3	2,999								1	88	1	144					1	2,767
Massachusetts.....	11	5,954		1	3	1	13	1	45	1	80	1	168		2	747		2	3,254
New Jersey.....	9	884		2	3	2	26	1	36	1	84	1	144	2	891				
New York.....	16	11,898				4	46	1	47	4	324	1	225	2	718		554	3	9,984
Pennsylvania.....	93	11,510	6	4	10	18	247	23	763	19	1,449	12	1,735	6	2,088	3	1,708	2	3,510

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of

interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 50 shows the total expenses in 1909 to have been \$62,311,110, distributed as follows: Cost of materials, \$39,563,004, or 63.5 per

cent; wages, \$15,536,050, or 24.9 per cent; salaries, \$2,209,042, or 3.5 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$5,003,014, or 8 per cent. Table 62 shows the per cent distribution of the expenses reported by the four states for which financial statistics can be given.

Table 62

STATE.	PER CENT OF TOTAL EXPENSES REPORTED IN THE CARPET AND RUG INDUSTRY: 1909			
	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.
United States.....	3.5	24.9	63.5	8.0
Massachusetts.....	4.2	24.7	67.0	4.2
New Jersey.....	5.9	25.0	59.8	9.4
New York.....	3.2	27.1	61.4	8.3
Pennsylvania.....	3.4	22.8	64.7	9.1
All other states.....	3.9	25.7	60.4	10.0

Engines and power.—The amount of power used in the industry was first reported at the census of 1869. Table 50 shows that the total horsepower used in the carpet and rug industry increased from 3,719 in 1869 to 38,553 in 1909. Table 63 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power increased from 26,740 horsepower in 1899 to 38,553 horsepower in 1909, or 44.2 per cent. In 1909, as in 1904 and 1899, the power of steam engines constituted a very large part of the total primary power, but it formed a smaller

proportion of the total in 1909 than in 1899—79.6 per cent, as compared with 86.4 per cent. Water power, also, showed a slight decrease in its proportion of the total in 1909, compared with 1904. There was an increase in the relative importance of the power of gas and other internal-combustion engines and of rented electric power. A great increase also appears in the use of electric motors for the distribution of power by means of current generated in the same establishment.

Table 63

POWER.	THE CARPET AND RUG INDUSTRY.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	388	208	178	38,553	33,945	26,740	100.0	100.0	100.0
Owned.....	175	193	178	34,485	32,686	26,271	89.5	96.3	98.2
Steam.....	143	166	155	30,680	29,631	23,091	79.6	87.3	86.4
Gas.....	8	2	1	500	55	35	1.3	0.2	0.1
Water wheels.....	24	25	22	3,305	2,988	3,145	8.6	8.8	11.7
Other.....					12		(¹)		
Rented.....	191	15		4,068	1,259	469	10.5	3.7	1.8
Electric.....	191	15		2,709	293		7.0	0.9	
Other.....				1,359	966	469	3.5	2.8	1.8
Electric motors.	546	198	5	10,906	5,587	192	100.0	100.0	100.0
Run by current generated by establishment.....	355	181	5	8,197	5,294	192	75.2	94.8	100.0
Run by rented power.....	191	15		2,709	293		24.8	5.2	

¹ Less than one-tenth of 1 per cent.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

Materials.—Table 64 shows the quantity and cost of the materials used in the carpet and rug industry for 1909, 1904, and 1899.

The total quantity of wool used, on the scoured equivalent basis, decreased somewhat between 1899 and 1904, but the increase from 1904 to 1909 was sufficient to make a net increase of 37 per cent for the decade. Practically all the wool used was of foreign origin, domestic wool constituting only four-tenths of 1 per cent of the total consumption of wool (in condition purchased) in 1909, 1.7 per cent in 1904, and two-tenths of 1 per cent in 1899. Most of the wool used in the manufacture of carpets and rugs is of comparatively low grade (coarse fiber), and domestic wool, which is nearly all of medium or high grade, is chiefly used in the mills making woolen and worsted cloths.

The importation of carpet wool (designated "class 3" in the statistics of imports and exports) in 1909 aggregated 101,876,052 pounds. (See report on the woolen industry.) The difference between the imports of carpet wool and the quantity reported as material by the carpet and rug mills represents for the most part the carpet wool spun into yarn in woolen and worsted mills and sold in that form to carpet and rug mills.

Table 64

MATERIAL.	MATERIALS USED IN THE CARPET AND RUG INDUSTRY.			
	1909	1904	1899	Per cent of increase: ¹ 1899-1909
Total cost	\$39,583,004	\$37,947,954	\$27,228,718	45.3
Wool, in condition, purchased:				
Pounds.....	64,135,020	51,320,521	51,871,334	23.6
Cost.....	\$11,752,396	\$10,431,146	\$8,104,107	45.0
Equivalent of above in scoured condition, pounds.....	51,474,353	31,551,895	37,560,231	37.0
Animal hair:				
Pounds.....	5,400,944	6,805,802	6,189,757	-12.7
Cost.....	\$474,057	\$593,588	\$549,610	-13.7
Cotton:				
Pounds.....	5,147,130	1,997,369	1,943,942	164.8
Cost.....	\$533,302	\$251,112	\$129,449	312.0
Waste and noils, purchased:				
Pounds.....	2,732,034	2,172,481	2,325,054	17.5
Cost.....	\$513,392	\$341,309	\$305,733	67.9
Yarns, purchased:				
Woolen—				
Pounds.....	25,718,747	32,431,400	32,996,316	-22.1
Cost.....	\$5,036,118	\$6,648,001	\$5,030,654	0.1
Worsted—				
Pounds.....	11,292,749	11,355,993	9,218,267	22.5
Cost.....	\$5,588,915	\$5,405,072	\$3,544,860	57.7
Cotton—				
Pounds.....	26,166,241	27,421,831	19,823,561	32.0
Cost.....	\$4,772,594	\$4,757,850	\$2,744,928	73.9
Linen—				
Pounds.....	8,792,876	8,228,200	8,388,211	4.8
Cost.....	\$1,606,009	\$1,355,892	\$1,164,826	37.9
Jute, ramie, and other vegetable fiber—				
Pounds.....	55,592,343	49,119,558	38,846,413	43.1
Cost.....	\$3,926,694	\$3,404,516	\$2,476,029	58.6
Chemicals and dyestuffs.....	\$1,729,492	\$1,467,476	\$1,151,726	50.2
All other materials.....	\$3,630,035	\$3,291,992	\$2,026,797	79.1

¹ A minus sign (—) denotes decrease.

Products.—The value of all products of the establishments in the carpet and rug industry in 1909 was \$71,188,152, the value of carpets and rugs alone being \$66,966,338. In addition, woolen and worsted rugs to the value of \$479,161 were reported as subsidiary products by establishments engaged primarily in the manufacture of cotton goods and of wool hats. The total value of the carpets and rugs manufactured in all industries was therefore \$67,445,499.

Table 67 shows the quantity and value of the principal products of the carpet and rug industry for 1909, 1904, and 1899. In comparing the percentages of increase in quantity with those in value, it should be remembered that each class of products includes a number of grades and styles, varying greatly in price, and that the relative quantities of these may have changed considerably from census to census. Prior to the census of 1909 carpets were reported in running yards (ingrain 36 inches wide and others 27 inches wide), while rugs woven whole were reported in square yards. In 1909 both carpets and rugs were reported in square yards; the figures for 1904 and 1899, therefore, have been reduced to square yards for the sake of comparability.

The total production of carpets and rugs in the industry in 1909 was 81,218,881 square yards, representing an increase of 6.3 per cent as compared with 1899, but a slight decrease (1.8 per cent) as compared with 1904. The total value of the carpets and rugs produced shows an increase of 53.8 per cent for the decade and an increase of 17.8 per cent for the five-year period 1904-1909.

The great decrease in the production of ingrain carpets between 1899 and 1909 was only partly counterbalanced by increases in other kinds of carpet, and the total production of carpets alone shows a decrease of 11 per cent for the decade. There was an increase, however, in all the principal classes of rugs except Smyrna rugs, the total production of rugs in 1909 being nearly twice that in 1899; and rugs constituted 29.6 per cent of the combined output of carpets and rugs in 1909, as compared with 15.9 per cent in 1899.

With the exception of ingrains, which still held the lead in quantity in 1909, tapestry and Axminster carpets are made in the greatest quantity; in fact, the increase in the production of Axminster carpets and rugs may be considered the leading feature of the industry for the decade.

The rugs reported included only those woven whole (seamless), those woven in strips and sewed together being reported as carpet, although the inclusion of the border in the pattern of this carpet permits of its being used only in rug form. In the case of body Brussels and Wilton rugs only the small sizes are woven whole.

Ingrain art squares, however, are commonly woven seamless, and there is a marked tendency toward weaving tapestry, velvet, and Axminster rugs on wide looms, and the production of seamless rugs is rapidly increasing. Although exact data in regard to the production of pieced rugs are not available, it is roughly estimated that the production of such rugs amounted to approximately 21,000,000 square yards in 1909.

Table 67

PRODUCT.	PRODUCTS OF THE CARPET AND RUG INDUSTRY.			
	1909	1904	1899	Per cent of increase: ¹ 1899-1909
Total value.....	2 \$71,188,152	2 \$81,586,433	\$48,192,351	47.4
Carpets:				
Square yards.....	57,176,729	66,426,033	64,238,761	-11.0
Value.....	\$48,475,889	\$43,991,125	\$35,405,926	36.9
Axminster and Moquette—				
Square yards.....	12,507,261	6,413,636	5,026,778	148.8
Value.....	\$13,680,806	\$6,368,757	\$4,762,269	187.3
Wilton—				
Square yards.....	4,576,368	1,297,872	3,587,126	27.6
Value.....	\$8,737,768	\$2,726,667	\$4,030,842	116.8
Brussels—				
Square yards.....	3,960,626	3,024,162	2,686,493	47.4
Value.....	\$5,216,607	\$3,898,675	\$2,979,867	75.1
Tapestry velvet—				
Square yards.....	3,927,198	3,833,288	4,280,066	61.8
Value.....	\$5,514,130	\$7,754,681	\$3,743,353	47.3
Tapestry Brussels—				
Square yards.....	11,405,514	14,099,074	8,737,449	30.5
Value.....	\$8,576,906	\$9,955,043	\$5,520,665	55.4
Ingrain—				
Square yards.....	17,799,762	33,557,951	39,920,849	-55.4
Value.....	\$6,749,672	\$13,237,302	\$14,368,930	-53.0
2-ply—				
Square yards.....	15,439,260	30,492,156	36,698,292	-57.9
Value.....	\$5,620,542	\$11,841,732	\$13,222,657	-57.5
3-ply—				
Square yards.....	2,360,502	3,065,795	3,222,557	-26.8
Value.....	\$1,129,130	\$1,445,570	\$1,146,273	-1.5
Rugs, woven whole:				
Square yards.....	24,042,152	16,244,810	12,171,289	97.5
Value.....	\$18,490,449	\$12,870,650	\$8,145,232	127.0
Axminster and Moquette—				
Square yards.....	3,184,097	1,767,920	327,598	872.0
Value.....	\$3,691,900	\$2,107,383	\$342,262	978.7
Wilton—				
Square yards.....	767,248	1,097,186	339,784	125.8
Value.....	\$1,381,562	\$1,983,777	\$545,967	153.0
Brussels—				
Square yards.....	475,831	(⁴)	(⁴)	.....
Value.....	\$333,582	(⁴)	(⁴)	.....
Tapestry velvet—				
Square yards.....	3,732,972	(⁴)	(⁴)	.....
Value.....	\$3,513,063	(⁴)	(⁴)	.....
Tapestry Brussels—				
Square yards.....	5,672,962	2,009,834	18,750	.....
Value.....	\$4,422,427	\$1,509,673	\$9,000	.....
Ingrain art squares—				
Square yards.....	6,131,862	7,135,546	2,722,323	125.2
Value.....	\$2,408,960	\$2,785,457	\$1,175,951	104.9
Smyrna—				
Square yards.....	1,400,233	3,828,282	3,651,661	-61.7
Value.....	\$1,660,322	\$4,134,500	\$3,680,618	-54.9
Other—				
Square yards.....	2,676,947	406,042	5,111,173	-47.6
Value.....	\$1,078,633	\$349,860	\$2,391,434	-54.9
All other products.....	\$4,221,814	\$4,724,658	\$4,641,193	-9.0

¹ A minus sign (-) denotes decrease.

² In addition, in 1909, carpets and rugs to the value of \$479,161 were reported by establishments engaged primarily in the manufacture of cotton goods and wool hats; in 1904, carpets and rugs to the value of \$70,000 were reported by establishments engaged primarily in the manufacture of other products.

³ Includes Wilton velvet.
⁴ Not reported separately.

Table 68 shows the percentage that the different kinds of carpets and of rugs manufactured in the industry formed of the total production of each of these two classes of products in 1909, 1904, and 1899.

KIND OF CARPETS AND RUGS.	PER CENT OF TOTAL PRODUCTION.		
	1909	1904	1899
Carpets.....	100.0	100.0	100.0
Axminster and Moquette.....	21.9	9.7	7.8
Wilton.....	8.0	2.0	5.6
Brussels.....	6.9	4.6	4.2
Tapestry velvet.....	12.1	12.1	6.7
Tapestry Brussels.....	19.9	21.2	13.6
Ingrain.....	31.1	50.5	62.1
2-ply.....	27.0	45.9	57.1
3-ply.....	4.1	4.6	5.0
Rugs, woven whole.....	100.0	100.0	100.0
Axminster and Moquette.....	13.2	10.9	2.7
Wilton.....	3.2	6.8	2.8
Brussels.....	2.0	(1)	(1)
Tapestry velvet.....	15.5	(1)	(1)
Tapestry Brussels.....	23.6	12.4	0.2
Ingrain art squares.....	25.5	43.9	22.4
Smyrna.....	5.8	23.6	30.0
Other.....	11.1	2.5	42.0

¹ Not reported separately.

The production of ingrain carpets dropped from 62.1 per cent of the total number of square yards of carpet in 1899 to 31.1 per cent in 1909, while all other kinds show gains, the production of Axminster and Moquette carpets increasing from 7.8 per cent of the total to 21.9 per cent.

Tapestry velvet and tapestry Brussels rugs contributed largely to the great increase in the rug production, their combined output amounting to 9,405,934 square yards, or 39.1 per cent of the total in 1909. Ingrain art squares represented 25.5 per cent of the total in 1909, as compared with 22.4 per cent in 1899.

Table 69 shows the quantity of the various kinds of carpets reported at each census from 1879 to 1909, inclusive. The quantities are expressed in running yards, and for 1909 in square yards also.

PRODUCT.	CARPETS PRODUCED IN THE CARPET AND RUG INDUSTRY.					
	1909		1904	1899	1889	1879
	Square yards.	Running yards.	Running yards.	Running yards.	Running yards.	Running yards.
Carpets, total.....	67,176,729	70,302,385	77,382,060	72,344,732	74,090,220	29,282,634
Ingrain.....	17,799,762	17,799,762	33,657,951	39,920,849	36,170,027	22,848,828
2-ply.....	15,439,260	15,439,260	30,492,156	1 36,698,262	1 32,918,659	1 21,986,434
3-ply.....	2,360,502	2,360,502	3,065,795	1 3,222,557	3,251,368	1 862,394
Tapestry Brussels.....	11,405,514	15,207,352	18,798,765	11,649,932	20,008,961	9,441,195
Body Brussels.....	3,960,626	5,280,835	4,032,216	3,581,991	9,442,348	4,077,190
Wilton and tapestry velvet.....	11,503,566	15,338,088	12,441,547	10,489,589	3,512,229	217,629
Wilton.....	4,576,368	6,101,824	1,730,496	2 4,782,835	2 1,030,101	2 157,629
Tapestry velvet.....	3 6,927,198	3 9,236,264	3 10,711,051	5,706,754	2,482,128	60,000
Axminster and Moquette.....	12,507,261	16,676,348	8,551,581	6,702,371	1 3,572,527	303,366
All other.....					1 1,384,128	2,394,426

¹ In addition, a small quantity was made in the woolen mills.

² Includes Wilton velvet.

³ Includes Wilton velvet, which was included with Wilton in 1899 and prior years.

In this table, to make the statistics for the several censuses comparable, Wilton velvet and tapestry velvet carpets have been combined. The separate statistics for Wilton, in 1909 and 1904, refer to Wilton proper, which is woven on a Jacquard loom with a cut pile; Wilton velvet, so called, which is woven on a tapestry loom with a cut pile being included under tapestry velvet. In 1899 and at previous censuses, however, Wilton and Wilton velvet were reported together.

The production of ingrain carpets increased from 1879 to 1899 and then declined, the output in 1909 of 2-ply and 3-ply combined being materially less than in 1879. The largest production of tapestry Brussels and also of body Brussels was reported for 1889, but that of Wilton and tapestry velvets combined, and of Axminster and Moquette carpets, increased throughout the period covered by the table.

Table 70 gives, by states, the output of carpets and rugs for the years 1909, 1904, and 1899, with the value for 1909 only.

Although the manufacture of carpets and rugs was reported from 11 states in 1909, the output was practically all reported from the states of Massachusetts, New Jersey, New York, Pennsylvania, and Connecticut, the last-named state, though ranking fourth in production and value of products, being included with

"all other states" to avoid disclosing the operations of individual establishments.

PRODUCT AND STATE.	THE CARPET AND RUG INDUSTRY.			
	1909		1904	1899
	Value.	Quantity (square yards).	Quantity (square yards).	Quantity (square yards).
Carpets.....	\$48,475,889	57,176,729	66,426,033	64,238,671
Massachusetts.....	10,358,191	7,496,772	6,760,552	6,818,672
New York.....	16,177,227	17,430,969	19,206,368	16,038,562
Pennsylvania.....	15,373,145	26,305,322	36,953,509	38,373,245
All other states.....	6,567,326	5,943,666	3,505,604	3,008,282
Rugs.....	18,490,449	24,042,152	16,244,810	12,171,289
Massachusetts.....	1,802,066	2,740,115	1,673,916	506,099
New Jersey.....	1,081,252	1,680,086	1,451,616	1,007,786
New York.....	9,300,529	9,542,662	3,353,505	5,765,693
Pennsylvania.....	6,197,173	9,916,758	8,810,343	4,673,052
All other states.....	109,429	162,531	955,431	218,759

New York, the most important state in the industry when measured by value of products, shows an increase of 8.7 per cent for the decade 1899-1909 in the number of square yards of carpet produced, but shows a decrease of 9.2 per cent for the five-year period 1904-1909. There was, however, a substantial increase in the combined production of carpets and rugs in the state during this five-year period.

Pennsylvania, while ranking second in value of products, was by far the most important state as re-

There were 11,943 carpet and rug looms of all classes reported by carpet and rug mills in 1909, of which 11,736 were power looms and 207 were hand looms. In 1899 there were 9,706 power looms and 1,048 hand looms. The proportion which hand looms formed of the total number thus decreased from 9.7 per cent in 1899 to 1.7 per cent in 1909. In 1889 there were 10,898 looms, of which 2,598, or 23.8 per cent, were hand looms. The number of narrow ingrain looms decreased 34.5 per cent during the decade from 1899 to 1909, while that of broad ingrain looms increased 221.9 per cent. Tapestry velvet, body Brussels, Wilton, and Axminster and Moquette looms, notably the last-named, also show decided gains.

Table 74 gives the loom equipment of the carpet and rug mills, by states, for 1909.

As shown by the table, Pennsylvania ranked first in 1909 in the number of nearly every kind of loom, reporting a total of 5,637, or 47.2 per cent of the looms used in the carpet and rug industry in the United States. New York ranked second, with 3,238 looms, or 27.1 per cent of the total, and Massachusetts third, with 1,778, or 14.9 per cent of the total. Pennsylvania reported 77.9 per cent of all looms used in the manufacture of ingrain carpets, while New York ranked first in the number of tapestry Brussels and

Axminster looms, and Massachusetts in the number of looms used on body Brussels and Wilton carpets.

Table 74

KIND.	NUMBER OF LOOMS USED IN THE CARPET AND RUG INDUSTRY: 1909						
	United States.	Connecticut.	Massachusetts.	New Jersey.	New York.	Pennsylvania.	All other states.
Looms on carpets and rugs, total	11,943	781	1,778	432	3,238	5,637	77
Power looms.....	11,736	781	1,774	415	3,186	5,530	50
Hand looms.....	207	.....	4	17	52	107	27
Carpet looms	10,032	781	1,763	277	2,517	4,655	39
Ingrain—							
Power.....	2,884	88	225	.....	100	2,439	32
Hand.....	26	.....	.....	.....	20	6	.....
Broad ingrain—							
Power.....	788	17	259	62	11	436	3
Hand.....	7	.....	.....	.....	.....	.....	.....
Tapestry Brussels.....	1,016	187	125	10	413	281	7
Tapestry velvet.....	1,138	67	24	80	377	500	.....
Body Brussels.....	636	17	346	3	107	159	4
Wilton.....	956	40	444	96	56	320	.....
Axminster.....	2,562	365	340	26	1,433	398	.....
Venetian—							
Power.....	18	.....	.....	.....	.....	18	.....
Hand.....	1	.....	.....	.....	.....	1	.....
Rug looms	1,911	.....	15	155	721	982	38
Tapestry—							
Smyrna.....	526	.....	.....	37	395	98	1
Power.....	964	.....	.....	101	277	576	10
Hand.....	57	.....	.....	13	29	15	.....
Wilton.....	62	.....	11	.....	5	46	.....
Colonial or rag—							
Power.....	186	.....	.....	.....	12	174	.....
Hand.....	116	.....	4	4	3	78	27

¹ In addition, 328 broad looms were employed on worsted goods, not carpets and rugs.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the carpet and rug industry, other than those relating to materials, products, and equipment, are presented, by states, in Tables 75 and 76.

Table 75 shows, for 1909, 1904, and 1899, the num-

ber of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 76 gives more detailed statistics for 1909.

CARPETS AND RUGS, OTHER THAN RAG—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	139	34,706	134	1,265	33,307	38,563	\$76,627	\$2,209	\$16,536	\$39,563	\$71,188	\$31,625
	1904	139	34,393	149	1,023	33,221	33,946	66,781	1,397	13,724	37,948	81,688	23,638
	1899	133	29,209	111	687	28,411	26,740	44,449	881	11,121	27,229	48,182	20,863
Massachusetts.....	1909	11	6,251	3	294	5,954	10,037	11,450	466	2,763	7,501	12,812	5,311
	1904	10	6,267	2	86	5,179	7,875	11,450	141	2,188	6,703	9,714	3,011
	1899	8	4,552	1	71	4,480	5,875	9,401	127	1,720	3,990	6,966	2,976
New Jersey.....	1909	9	939	6	49	884	970	2,511	88	375	898	1,945	1,047
	1904	8	1,203	3	47	1,153	2,098	2,511	90	418	979	1,749	770
	1899	13	1,221	3	47	1,171	1,051	1,487	73	379	868	1,523	655
New York.....	1909	16	12,272	11	363	11,898	11,901	27,628	686	5,870	13,315	25,606	12,291
	1904	12	11,354	8	269	11,077	10,151	19,830	328	4,567	11,133	19,404	8,271
	1899	12	8,795	3	189	8,603	7,783	12,870	250	3,308	7,681	15,029	7,348
Pennsylvania.....	1909	93	12,078	108	460	11,510	13,073	24,721	762	5,169	14,648	24,879	10,231
	1904	102	14,356	136	504	13,716	11,871	22,284	652	5,829	16,706	27,120	10,414
	1899	93	13,358	103	336	12,919	10,537	17,958	375	5,331	13,774	23,113	9,339
All other states.....	1909	10	3,166	6	93	3,061	2,672	9,417	207	1,359	3,201	5,946	2,745
	1904	7	2,213	.....	117	2,096	2,780	4,664	186	722	2,427	3,609	1,172
	1899	7	1,283	1	44	1,238	1,494	2,733	56	383	916	1,561	645

THE WOOLEN INDUSTRY.

131

CARPETS AND RUGS, OTHER THAN RAG—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.								WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horse-power.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.
								Maximum. month.	Minimum. month.						
United States	139	34,709	134	314	801	160	33,307	De 34,097	Ap 32,719	34,874	19,601	13,859	796	618	38,553
Massachusetts.....	11	6,251	3	46	205	43	5,954	Fe 6,102	Ap 5,855	6,087	3,155	2,566	213	153	10,037
New Jersey.....	9	939	8	26	21	2	884	De 1,008	Je 779	1,008	897	294	15	2	970
New York.....	18	12,272	11	70	264	29	11,898	De 12,192	Ja 11,570	12,192	6,708	5,406	51	27	11,901
Pennsylvania.....	93	12,078	108	151	246	63	11,510	Fe 11,875	Oc 11,189	12,454	7,461	4,354	342	297	13,073
All other states ¹	10	3,166	6	21	65	13	3,061	.....	.....	3,133	1,580	1,239	175	139	2,572

STATE.	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States	\$75,627,010	\$82,311,110	\$1,144,419	\$1,064,623	\$15,538,050	\$939,568	\$38,623,436	\$212,621	\$281,763	\$172,873	\$4,335,757	\$71,199,152	\$31,625,148
Massachusetts.....	11,450,096	11,202,188	202,914	262,873	2,763,263	237,869	7,263,241	9,923	138,591	3,400	320,114	12,811,981	5,310,871
New Jersey.....	2,510,704	1,500,709	59,802	28,032	374,823	13,711	883,804	240	8,775	.....	131,522	1,945,217	1,047,702
New York.....	27,527,817	21,680,151	323,580	362,836	5,870,298	309,336	13,005,837	106,555	65,661	35,523	1,600,529	25,606,262	12,291,090
Pennsylvania.....	24,720,792	22,832,265	450,043	312,227	5,169,275	276,388	14,371,910	95,528	38,627	125,712	1,792,555	24,879,232	10,230,934
All other states ¹	9,417,801	5,295,797	108,080	98,655	1,358,391	102,265	3,098,644	375	30,109	8,238	491,040	5,945,460	2,744,551

¹ All other states embrace: Connecticut, 3 establishments; Indiana, 1; Maryland, 1; New Hampshire, 1; Ohio, 2; Virginia, 1; Wisconsin, 1.

THE SHODDY INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—Shoddy, as a generic term, refers to reclaimed wool and cotton fiber of any sort—that is, to the fiber obtained by passing woolen, worsted, or union rags, tailors' clippings, and all kinds of mill wastes through "pickers," which reduce them to a fibrous form so that they can be mixed with new wool and spun into yarn. Following the English custom, the term "shoddy" is applied to the fiber manufactured from waste yarn and soft fabrics, that made from hard-spun fabrics being termed "mungo," while that obtained from union or cotton-mixed fabrics by carbonizing the cotton fiber with chemicals is called "wool extract." The shoddy mills also make considerable quantities of flocks, which consists of short, refuse wool, the shearings of woolen goods, or wool dust, and is utilized to weight certain kinds of woolen cloth, to coat waterproof garments, in the surfacing of some

wall papers, and for other purposes. The statistics presented in this report, except as otherwise noted, relate only to establishments manufacturing shoddy, mungo, carbonized rags, or wool extract as a primary product, including, as at previous censuses, mills engaged primarily in the cutting of flocks and the cleaning or garnetting of mill waste.

Comparison with earlier censuses.—Statistics for the shoddy industry were first obtained at the census of 1859, when 30 establishments, giving employment to an average of 290 hands, and manufacturing products to the value of \$402,590, were reported. At the census of 1869, 56 establishments were reported, these establishments employing an average of 632 hands and manufacturing products to the value of \$1,768,592. Table 77 summarizes the statistics of the shoddy industry for each census from 1879 to 1909, inclusive.

Table 77	THE SHODDY INDUSTRY.									
	Number or amount.					Per cent of increase. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	88	97	105	94	73	-16.2	-9.3	-7.6	11.7	28.8
Persons engaged in the industry.....	2,320	2,371	2,167	(?)	(?)	7.1	-2.2	9.4	-----	-----
Proprietors and firm members.....	83	110	102	(?)	(?)	-18.6	-24.5	7.8	-----	-----
Salaried employees.....	196	172	139	(?)	(?)	41.0	14.0	23.7	-----	-----
Wage earners (average number).....	2,041	2,089	1,926	2,155	1,282	6.0	-2.3	8.5	(?)	(?)
Primary horsepower.....	13,820	12,244	11,455	7,059	(?)	20.6	12.9	6.9	62.3	-----
Capital.....	\$6,886,825	\$5,804,164	\$5,272,929	\$3,754,063	\$1,165,100	30.6	18.7	10.1	40.5	222.2
Expenses.....	6,656,311	7,597,483	6,083,993	(?)	(?)	9.4	-12.4	24.9	-----	-----
Services.....	1,136,376	1,080,225	915,652	707,099	400,326	30.7	10.8	18.0	29.5	76.6
Salaries.....	289,685	245,403	166,704	(?)	(?)	73.8	18.0	47.2	-----	-----
Wages.....	906,691	834,822	748,948	(?)	(?)	21.1	8.6	11.5	-----	-----
Materials.....	5,000,706	6,055,731	4,875,192	6,003,035	3,368,650	2.6	-17.4	24.2	-18.8	78.3
Miscellaneous.....	459,229	461,627	293,149	238,094	(?)	56.7	-0.5	57.4	23.1	-----
Value of products.....	7,446,364	8,406,425	6,730,974	7,887,000	4,989,615	10.6	-11.4	24.9	-14.7	58.1
Value added by manufacture (value of products less cost of materials).....	2,445,658	2,350,694	1,855,782	1,883,965	1,622,965	31.8	4.0	26.7	-1.5	16.1

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available. ³ Figures not strictly comparable.

The number of establishments reporting in 1909 was smaller than at any census since 1879. The value of products in 1909 represented an increase of 49.2 per cent as compared with 1879, and a decrease of 5.6 per cent as compared with 1889. All the items included in the table, except number of establishments and of proprietors and firm members, show increases in 1909 as compared with 1899, that in the number of wage earners being 6 per cent, that in cost of materials 2.6 per cent, and that in value of products 10.6 per cent. These gains, however, were due to large increases during the first half of the decade, since de-

creases were reported for each of the items for the five-year period 1904-1909, that in wage earners amounting to 2.3 per cent, and that in value of products to 11.4 per cent. The value of the products of the shoddy industry in 1909 was \$7,446,364, and the value added by manufacture (that is, the value of products less the cost of materials), \$2,445,658, the cost of materials being equal to more than two-thirds (67.2 per cent) of the value of products.

Summary, by states.—Table 78 summarizes the more important statistics of the industry, by states, for 1909, 1904, and 1899.

Table 78

STATE.	THE SHODDY INDUSTRY.												
	Cen-sus.	Num-ber of estab-lish-ments.	Persons engaged in the industry.				Primary horse-power.	Capital.	Sala-ries.	Wages.	Cost of materials.	Value of products.	Value added by manu-facture (value of products less cost of mate-rials).
			Total.	Pro-prietors and firm mem-bers.	Sala-ried employ-ees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1899	88	2,320	83	188	2,041	13,820	\$8,887	\$289	\$907	\$5,001	\$7,448	\$2,445
	1904	97	2,371	110	172	2,089	12,244	5,804	245	835	6,058	8,406	2,350
	1899	105	2,167	102	139	1,928	11,455	5,273	187	748	4,875	6,731	1,858
Connecticut.....	1909	6	114	5	11	98	1,170	450	12	45	197	324	127
	1904	6	145	7	14	124	891	517	16	55	363	468	105
	1899	7	139	13	8	118	1,294	494	8	44	362	538	176
Massachusetts.....	1909	27	518	21	55	442	4,888	1,519	89	202	1,194	1,766	572
	1904	31	520	29	47	444	4,083	1,206	89	190	1,250	1,815	565
	1899	29	398	29	30	307	3,622	769	35	128	685	988	303
New York.....	1909	14	255	7	25	223	1,962	965	33	106	624	809	245
	1904	11	223	10	18	195	1,037	514	21	80	497	702	205
	1899	9	185	11	7	167	899	330	6	66	311	443	132
Ohio.....	1909	4	469	1	30	438	1,100	1,096	82	200	742	1,257	515
	1904	5	450	3	21	428	1,100	923	37	158	948	1,239	291
	1899	6	509	.....	35	474	1,035	1,398	55	185	1,078	1,479	401
Pennsylvania.....	1909	20	518	32	36	450	2,170	1,827	47	188	1,463	2,051	588
	1904	23	429	35	34	360	1,960	1,218	43	142	1,713	2,204	491
	1899	26	421	19	34	368	1,632	972	25	148	1,070	1,449	379
All other states.....	1909	17	446	17	39	390	2,710	1,230	46	168	781	1,179	398
	1904	21	604	28	38	540	3,173	1,428	59	210	1,285	1,978	693
	1899	28	547	30	25	492	3,173	1,310	38	198	1,369	1,834	465

In 1909 the state of Pennsylvania led in value of products, number of wage earners employed, and value added by manufacture. Massachusetts, Ohio, New York, and Connecticut followed in the order named. Pennsylvania, Massachusetts, and New York show increases in number of wage earners and value of products for the decade 1899-1909, although Massachusetts shows small decreases in both items and Pennsylvania a small decrease in value of products for the five-year period 1904-1909. Connecticut and Ohio, on the other hand, show decreases in both items for the decade as a whole, although in the case of Ohio all of the decrease took place during the five-year period 1899-1904. There was a decrease during the decade in the number of establishments in each state shown separately in Table 78, except New York.

Persons engaged in the industry.—Table 79 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the operation of the shoddy mills during 1909 was 2,320, of whom 2,041, or 88 per cent, were wage earners, 184, or 7.9 per cent, proprietors and officials, and 95, or 4.1 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 1,840, or 79.3 per cent, were males and 480, or 20.7 per cent, females. Of the males, 86.7 per cent, and of the females, 92.9

per cent, were wage earners. Only two children under 16 years of age were reported as wage earners.

Table 79

CLASS.	PERSONS ENGAGED IN THE SHODDY INDUSTRY: 1909		
	Total.	Male.	Female.
A1 classes.....	2,320	1,840	480
Proprietors and officials.....	184	172	12
Proprietors and firm members.....	83	76	7
Salaried officers of corporations.....	48	45	3
Superintendents and managers.....	53	51	2
Clerks.....	95	73	22
Wage earners (average number).....	2,041	1,595	446
16 years of age and over.....	2,039	1,693	446
Under 16 years of age.....	2	2	.....

Wage earners employed, by months.—Table 80 gives the number of wage earners employed in the shoddy industry on the 15th (or the nearest representative day) of each month during the year 1909.

Table 80

MONTH.	WAGE EARNERS EMPLOYED IN THE SHODDY INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	1,980	91.9
February.....	2,025	94.0
March.....	2,041	94.7
April.....	2,010	93.3
May.....	2,024	93.9
June.....	2,040	94.7
July.....	2,035	94.4
August.....	2,003	92.9
September.....	2,033	94.3
October.....	2,070	96.1
November.....	2,077	96.4
December.....	2,155	100.0

The largest number of wage earners employed during any month of 1909 was 2,155 in December, and the smallest number 1,980 in January, the minimum number being equal to 91.9 per cent of the maximum. In 1904 the maximum number, 2,182, was shown for December, and the minimum number, 2,007, for June, the latter number being equal to 92 per cent of the former. The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for the principal states in Table 89.

Prevailing hours of labor.—In Table 81 the wage earners in the shoddy industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

STATE.	AVERAGE NUMBER OF WAGE EARNERS IN THE SHODDY INDUSTRY: 1909							
	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	2,041	5	28	5	387	1,320	268	28
Connecticut.....	98					98		
Massachusetts.....	442		24	2	184	206		26
New York.....	223	1	4		30	186		2
Ohio.....	438					170	268	
Pennsylvania.....	450			3	88	359		
All other states.....	390	4			85	301		

Of the 2,041 wage earners employed in the industry in 1909, 1,320, or 64.7 per cent, were employed in establishments where the prevailing hours were 60 per week; 387, or 19 per cent, were in establishments where the hours were between 54 and 60; and 268, or 13.1 per cent, in establishments where the hours were between 60 and 72. All the wage earners in this latter group were reported from Ohio, in which state this was the most common working time; in all the other states shown separately in the table the most common working time was 60 hours per week.

Character of ownership.—Table 82 presents statistics with respect to the character of ownership of the shoddy mills in the United States.

In 1909, of the total number of mills, 36.4 per cent were under corporate ownership, as compared with 27.8 per cent in 1904. The value of products of such establishments represented 53.3 per cent of the total for the industry in 1909, and 45.5 per cent in 1904. Establishments under firm ownership, which ranked second in importance in 1904 as measured by value of products, with more than one-third of the total, show a

considerable decrease both in number and in value of products for the five-year period covered by the table, contributing only 18 per cent of the total value of products in 1909. Establishments under individual ownership, on the other hand, show a considerable increase in value of products for the five-year period, reporting 28.7 per cent of the total in 1909, as against 18.7 per cent in 1904.

CHARACTER OF OWNERSHIP.	THE SHODDY INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	88	97	\$7,448,364	\$8,406,425
Individual.....	39	40	2,135,186	1,570,315
Firm.....	17	30	1,342,739	3,008,583
Corporation.....	32	27	3,968,439	3,827,527
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	44.3	41.2	28.7	18.7
Firm.....	19.3	30.9	18.0	35.8
Corporation.....	36.4	27.8	53.3	45.5

Size of establishments.—Table 83 presents statistics for 1909 and 1904 for establishments in the shoddy industry grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	THE SHODDY INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	88	97	\$7,448,364	\$8,406,425
Less than \$5,000.....	18	15	48,473	36,525
\$5,000 and less than \$20,000.....	19	25	196,815	272,475
\$20,000 and less than \$100,000.....	27	29	1,403,160	1,485,369
\$100,000 and over.....	24	28	5,797,916	6,602,056
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	20.5	15.5	0.7	0.4
\$5,000 and less than \$20,000.....	21.6	25.8	2.6	3.2
\$20,000 and less than \$100,000.....	30.7	29.9	18.8	17.8
\$100,000 and over.....	27.3	28.9	77.9	78.5

While establishments manufacturing products valued at over \$100,000 represented only a little more than one-fourth of the total number at both censuses, they reported 77.9 per cent of the total value of products in 1909 and 78.5 per cent in 1904. None of the establishments reported products to the value of \$1,000,000 in either year.

The average value of products per establishment decreased from \$86,664 in 1904 to \$84,618 in 1909, but the average value added by manufacture, as computed from the figures in Table 77, increased from \$24,234 to \$27,792. The average number of wage earners per establishment shows an increase from 21.5 in 1904 to 23.2 in 1909.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits.

Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 77 shows the total expenses in 1909 to have been \$6,656,311, distributed as follows: Cost of materials, \$5,000,706, or 75.1 per cent; wages, \$906,691, or 13.6 per cent; salaries, \$289,685, or 4.4 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$459,229, or 6.9 per cent. There was considerable variation in the proportions represented by the different classes of expenses in the several states, the percentage for cost of materials ranging from 65.2 in Ohio to 82.7 in Pennsylvania, and that for wages from 10.5 in Pennsylvania to 17.6 in Ohio.

Engines and power.—Table 84 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the shoddy mills increased from 11,455 in 1899 to 13,820 in 1909, or 20.6 per cent. Power generated by steam engines forms the greater part of the power used in the industry, although such power represented a smaller proportion of the total primary power in 1909 than in 1904 and 1899. Water power represented about the same proportion of the total in both 1909 and 1899 (35.6 per cent and 35.5 per cent, respectively), the proportion

decreasing during the first half of the decade, but increasing between 1904 and 1909.

Table 84 THE SHODDY INDUSTRY.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	164	163	155	13,820	12,244	11,455	100.0	100.0	100.0
Owned.....	147	155	155	13,107	11,426	11,237	94.8	93.3	98.1
Steam.....	80	89	90	8,135	7,825	7,123	58.9	63.9	62.2
Gas.....	1	.....	2	50	.....	45	0.4	.....	0.4
Water wheels.....	65	66	63	4,747	3,601	4,069	34.3	29.4	35.5
Water motors.....	1	.....	.....	176	.....	.....	1.3	.....	.....
Rented.....	17	8	.....	713	818	218	5.2	6.7	1.9
Electric.....	17	8	.....	545	417	.....	3.9	3.4	.....
Other.....	.....	.....	.....	168	401	218	1.2	3.3	1.9
Electric motors.....	42	16	3	953	818	105	100.0	100.0	100.0
Run by current generated by establishment.....	25	8	3	408	201	105	42.8	32.5	100.0
Run by rented power.....	17	8	.....	545	417	.....	57.2	67.5	.....

Fuel consumed.—Bituminous coal was the principal class of fuel used, 41,345 short tons being consumed in the industry in 1909. The total amount expended for fuel and rent of power, as shown in Table 89, was \$168,398.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

Materials.—Table 85 shows statistics of the materials used in the industry for 1909, 1904, and 1899.

Table 85 THE SHODDY INDUSTRY.

MATERIAL.	1909			Per cent of increase: 1899-1909
	1909	1904	1899	
Total cost	\$5,000,706	\$6,055,731	\$4,875,182	2.6
Tailors' clippings, rags, etc.:				
Pounds.....	64,561,713	68,921,097	79,623,312	-18.9
Cost.....	\$3,051,045	\$4,295,641	\$3,558,706	-14.3
Waste and noils of wool, mohair, camel's hair, etc.:				
Pounds.....	7,567,579	8,177,846	4,236,028	78.6
Cost.....	\$917,976	\$909,754	\$693,972	32.3
Wool, in condition purchased:				
Pounds.....	237,097	597,492	422,349	-43.9
Cost.....	\$98,032	\$127,927	\$127,099	-22.9
Equivalent of above in scoured condition, pounds.....	196,097	421,492	242,997	-19.3
Chemicals and dyestuffs.....	\$138,241	\$142,455	\$111,095	24.4
All other materials.....	\$795,412	\$579,954	\$384,320	107.0

¹ A minus sign (-) denotes decrease.

The total cost of materials increased 24.2 per cent from 1899 to 1904, but decreased 17.4 per cent from 1904 to 1909, the increase for the decade being 2.6 per cent. The quantity of tailors' clippings, rags, etc., used decreased from 79,623,312 pounds in 1899 to 64,561,713 pounds in 1909, or 18.9 per cent; the decrease in value was 14.3 per cent. The cost of this class of materials represented 73 per cent of the total cost of materials in 1899 and 61 per cent in 1909. The waste and noils of wool, mohair, camel's hair, etc., used

in the industry show an increase of 78.6 per cent in quantity and of 32.3 per cent in value for the decade, although for the five-year period 1904-1909 there was a decrease of 7.5 per cent in consumption, the cost, however, increasing nine-tenths of 1 per cent.

Products and equipment.—Table 86 shows for 1909, 1904, and 1899 the quantity and value of the several kinds of products of the shoddy mills and the number of pickers and garnett machines employed.

Table 86 THE SHODDY INDUSTRY.

PRODUCT.	1909			Per cent of increase: 1899-1909
	1909	1904	1899	
Total value	\$27,448,364	\$8,406,425	\$6,730,974	10.6
Shoddy and mungo:				
Pounds.....	48,375,724	54,401,295	39,014,661	24.0
Value.....	\$5,699,260	\$6,531,689	\$5,388,378	5.8
Wool extract:				
Pounds.....	5,637,514	6,375,768	4,980,825	13.2
Value.....	\$865,528	\$727,912	\$620,504	39.5
Flocks:				
Pounds.....	1,638,013	2,968,203	2,080,758	-21.3
Value.....	\$107,697	\$143,536	\$131,894	-18.3
Waste:				
Pounds.....	2,237,748	42,504	1,608,470	39.1
Value.....	\$275,545	\$1,544	\$148,043	86.1
All other products.....	\$268,708	\$365,805	\$151,494	77.4
Receipts for work on materials for others.....	\$229,626	\$335,939	\$290,661	-21.0
MACHINERY.				
Pickers, number.....	346	317	(²)	.....
Garnett machines, number.....	158	116	(²)	.....

¹ A minus sign (-) denotes decrease.

² In addition, shoddy to the value of \$367,278 was made for sale by establishments engaged primarily in the manufacture of other products.

* Not reported.

The total value of the products of shoddy manufacturing establishments increased 24.9 per cent from 1899 to 1904, but decreased 11.4 per cent from 1904 to 1909, the increase for the decade being \$715,390, or 10.6 per cent. The value of shoddy and mungo represented 76.5 per cent of the total for the industry in 1909 and 80.1 per cent in 1899. The output of these products shows an increase of 24 per cent, and their value an increase of 5.8 per cent, for the decade, although during the five-year period 1904-1909 there was a decrease of 11.1 per cent in quantity and 16.6 per cent in value. In the case of wool extract there was an increase of 13.2 per cent in output for the decade and of 39.5 per cent in its value; the output decreased 11.6 per cent between 1904 and 1909, however, although its value increased 18.9 per cent. The quantity and value of flocks manufactured decreased during the decade, all of the decrease, however, taking place between 1904 and 1909.

Table 87 shows, for 1909 and 1904, the total quantity of shoddy made in all mills manufacturing this product, whether for sale or for use in further manufacture.

	SHODDY PRODUCTION (POUNDS).	
	1909	1904
Total	84,500,865	127,897,283
For sale.....	51,555,032	57,095,269
By shoddy mills.....	48,375,724	54,401,295
By other establishments.....	3,179,308	2,693,974
For use in the same establishment.....	32,945,633	70,801,994
By establishments manufacturing primarily—		
Woolen goods.....	31,021,323	70,102,848
Worsted goods.....	1,045,310	255,587
Felt goods.....	875,000	442,079
Carpets and rugs.....	4,000	
Wool hats.....		500

There was a decrease of 43,396,598 pounds, or 33.9 per cent, in the total production of shoddy by all industries in 1909 as compared with 1904. Of the shoddy used in 1909 in the establishments where manufactured, 94.2 per cent was made in establishments engaged primarily in the manufacture of woolen goods, the corresponding percentage for 1904 being 99. Establishments manufacturing shoddy for sale reported 44.6 per cent of the total production in 1904 and 61 per cent in 1909.

The inquiry relating to the amount of shoddy produced in woolen mills for their own use was, in some instances, answered unsatisfactorily by the manufac-

turers, and in such cases estimates were made. Since 41,517,552 pounds of tailors' clippings, rags, etc., were reported as consumed in the woolen industry, the quantity of shoddy reported as made in the industry (32,941,633 pounds) would appear to be approximately correct.

A feature of the development of the woolen industry during the five-year period 1904-1909 was the decrease in the amount of shoddy consumed and the increase in that of scoured wool. Table 88 shows the amount of scoured wool and shoddy used in the woolen industry, including that used in the manufacture of carpets and rugs, in 1909, 1904, and 1899, and the proportion which each represented of the combined total.

MATERIAL.	SCOURED WOOL AND SHODDY USED IN WOOL MANUFACTURES.					
	1909		1904		1899	
	Quantity (pounds).	Per cent of total.	Quantity (pounds).	Per cent of total.	Quantity (pounds).	Per cent of total.
Total	410,301,785	100.0	388,778,668	100.0	310,123,960	100.0
Scoured wool.....	352,478,605	85.9	282,194,618	72.6	238,632,452	76.9
Shoddy.....	57,823,190	14.1	106,584,050	27.4	71,496,508	23.1
Purchased.....	24,877,557	6.1	35,782,056	9.2	34,496,508	11.1
Made in establishments using.....	32,945,633	8.0	70,801,994	18.2	37,000,000	11.9

During the five-year period 1899-1904 there was an increase in the value of products of the woolen goods branch of the industry, in which shoddy is used as material to a considerable extent, this fact being reflected not only in the increase during that five-year period in the consumption of shoddy, as shown in the table, but in the increase in the proportion which it represented of the total consumption of scoured wool and shoddy combined. Between 1904 and 1909, however, the woolen goods branch of the industry declined, while the worsted goods branch, in which shoddy is used to only a slight extent, made a phenomenal gain, with the result that the consumption of shoddy fell off from 106,584,050 pounds in 1904 to 57,823,190 pounds in 1909, or 45.7 per cent, while the proportion which it represented of the combined total decreased from 27.4 per cent to 14.1 per cent.

Detailed state table.—The principal statistics secured by the census inquiry concerning the shoddy industry are presented, by states, in Table 89, which gives detailed statistics for 1909 only.

SHODDY—DETAILED STATISTICS, BY STATES: 1909.

Table 89

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.			Under 16.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.		Male.	Female.
								Maximum month.	Minimum month.						
United States.....	88	2,320	83	101	73	22	2,041	De 2,155	Ja 1,980	2,188	1,708	478	2	13,820	
Connecticut.....	6	114	5	5	6	.....	98	De 107	Se 88	106	97	9	.....	1,170
Massachusetts.....	27	518	21	34	14	7	442	Fe ¹ 450	Se 422	474	414	58	2	4,888	
New York.....	14	255	7	18	5	2	223	No ¹ 255	Ja ¹ 189	255	213	42	.....	1,982
Ohio.....	4	469	1	12	16	2	438	Mh ¹ 442	Au 432	441	302	139	.....	1,100
Pennsylvania.....	20	518	32	14	15	7	450	De 462	Ja 432	466	353	113	.....	2,170
All other states*.....	17	446	17	18	17	4	390	.....	.....	444	327	117	.....	2,710

STATE.	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States.....	\$8,836,825	\$8,656,311	\$182,983	\$108,892	\$508,631	\$168,398	\$4,832,308	\$18,947	\$40,783	\$3,681	\$335,938	\$7,448,384	\$2,445,658
Connecticut.....	450,459	267,170	5,760	5,970	45,305	9,049	188,151	150	1,781	.....	11,004	324,251	127,051
Massachusetts.....	1,518,773	1,608,530	64,631	24,665	202,252	51,814	1,141,587	4,436	12,597	669	106,479	1,785,609	572,208
New York.....	965,363	806,326	27,919	5,346	106,293	17,178	606,808	3,240	3,596	.....	35,946	860,364	245,378
Ohio.....	1,095,552	1,137,725	32,700	29,879	199,770	26,710	714,934	.....	10,781	.....	123,171	1,257,173	515,529
Pennsylvania.....	1,627,096	1,770,058	26,826	20,413	185,740	30,633	1,432,585	8,868	6,088	2,912	58,195	2,051,118	587,900
All other states*.....	1,229,572	1,066,502	25,957	20,819	187,331	33,014	748,243	4,253	5,942	.....	81,143	1,178,840	397,592

¹ Same number reported for one or more other months.
² All other states embrace: California, 1 establishment; Georgia, 1; Illinois, 1; Maine, 1; New Jersey, 5; North Carolina, 1; Rhode Island, 3; Tennessee, 1; Vermont, 2; and Wisconsin, 1.

WOOL PULLING AND WOOL SCOURING.

WOOL PULLING.

This industry includes establishments pulling wool, on contract, from pelts owned by others, and reporting as value of products only the amount received for work done, as well as establishments that buy the pelts and report their cost under cost of materials, and the value of the wool and skins under value of products. Variations in the relative importance of these two classes of establishments render it impracticable to make any significant comparisons of cost of materials and value of products for different censuses. Table 90 summarizes the statistics for the industry, that is, for the independent wool pulling establishments, for 1909, 1904, and 1899.

	WOOL-PULLING INDUSTRY.					
	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments..	37	34	34	8.8	8.8	.....
Persons engaged in the industry.....	759	786	541	40.3	-3.4	45.3
Proprietors and firm members.....	37	40	31	19.4	-7.5	29.0
Salaried employees.....	91	65	35	160.0	40.0	85.7
Wage earners (average number).....	631	681	475	32.8	-7.3	43.4
Primary horsepower.....	1,366	1,324	820	66.6	3.2	61.5
Capital.....	\$3,247,928	\$2,534,029	\$944,715	243.8	28.2	168.2
Expenses.....	4,876,919	671,549	384,742	1,167.6	626.2	74.5
Services.....	518,511	439,169	283,372	83.0	18.1	55.0
Salaries.....	131,596	74,415	35,422	271.5	76.8	110.1
Wages.....	386,915	364,754	247,950	56.0	6.1	47.1
Materials.....	4,103,250	103,984	53,975	(²)	(²)	(²)
Miscellaneous.....	255,153	128,396	47,395	438.4	98.7	170.9
Value of products.....	5,180,856	881,706	531,287	(²)	(²)	(²)
Value added by manufacture (value of products less cost of materials).....	1,077,606	777,722	477,312	125.8	38.6	62.9

¹ A minus sign (-) denotes decrease.

² Figures not comparable.

Large quantities of wool are pulled in slaughtering and meat-packing establishments, which in 1909 reported 21,858,926 pounds, and tanning establishments, including those tanning leather for their own use, which reported 8,218,363 pounds in 1909.

WOOL SCOURING.

Wool scouring is now, and always has been, in this country, chiefly done in the mills. The independent scouring plants are a recent development.

Table 91 summarizes the statistics of the wool-scouring industry (that is, of the independent establishments engaged in wool scouring) for 1909, 1904, and 1899. The statistics for such establishments were not segregated prior to 1899.

	WOOL-SCOURING INDUSTRY.					
	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments..	28	27	25	12.0	3.7	8.0
Persons engaged in the industry.....	1,262	852	776	62.6	48.1	9.8
Proprietors and firm members.....	18	18	11	63.6	.....	63.6
Salaried employees.....	102	55	45	126.7	85.5	22.2
Wage earners (average number).....	1,142	779	720	58.6	46.6	8.2
Primary horsepower.....	6,782	3,478	2,900	133.9	95.1	19.9
Capital.....	\$3,257,585	\$1,187,716	\$1,061,123	207.0	174.3	11.9
Expenses.....	2,967,331	839,284	706,482	320.0	253.6	18.8
Services.....	700,364	475,505	410,617	70.6	47.3	16.8
Salaries.....	142,646	77,694	72,011	98.1	83.6	7.9
Wages.....	657,718	397,811	338,606	64.7	40.2	17.5
Materials.....	2,122,102	214,624	193,826	(²)	(²)	(²)
Miscellaneous.....	144,865	149,155	102,039	42.0	-2.9	46.2
Value of products.....	3,289,215	1,052,909	889,809	(²)	(²)	(²)
Value added by manufacture (value of products less cost of materials).....	1,167,113	838,285	695,983	67.7	39.2	20.4

¹ A minus sign (-) denotes decrease.

² Figures not comparable.

The number of establishments engaged primarily in wool scouring increased only 12 per cent during the decade 1899-1909, though the average number of wage earners increased 58.6 per cent. In some cases the wool scoured is owned by the establishment and its cost is included in the cost of materials and its value in the value of products; in other cases, when the work is done under contract, the value of products represents only the amount received for work done on materials furnished by others. The statistics for 1909, in particular, cover a number of cases where the raw wool was purchased, and consequently the statistics for cost of materials and value of products as reported at the different censuses are not comparable. Statistics for the quantity of wool scoured by the independent establishments in 1909 are not available. The total quantity of scoured wool used in the textile industries was approximately 352,000,000 pounds, but the bulk of this was scoured in the establishments where it was used.

HATS, FUR-FELT

THE FUR-FELT HAT INDUSTRY.

Summary for the United States.—The establishments assigned to this industry manufacture stiff and soft hats from hatters' fur. All of the various processes, from the first treatment of the raw fur to the turning out of the finished product, are carried on in some of the establishments, while others purchase hat bodies in the rough and finish and trim them.

Table 1 summarizes the statistics of the industry for each census from 1899 to 1909, inclusive.

While the manufacture of fur-felt hats by machinery has been carried on in the United States for more than 60 years, it was not until the census of 1899 that separate statistics for the industry were obtained. Before that the statistics were included with those for the industry "hats and caps, not including wool hats." The industry grew with a considerable degree of uniformity during the decade covered by Table 1, the percentage of gain in the number of establishments and value of products being about the same for each of the five-year periods. The number of persons engaged during 1909 was 27,091, as compared with 19,814 in 1899.

	NUMBER OR AMOUNT.			PER CENT OF INCREASE.		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments.....	273	216	171	59.6	26.4	26.3
Persons engaged in the industry.....	27,091	23,666	19,814	36.7	14.5	19.4
Proprietors and firm members.....	264	252	208	26.9	4.8	21.2
Salaried employees.....	1,763	1,367	726	142.8	29.0	68.3
Wage earners (average number).....	25,064	22,047	18,880	32.8	13.7	16.8
Primary horsepower.....	19,245	16,630	11,843	62.5	15.7	40.4
Capital.....	\$35,733,594	\$23,258,104	\$16,701,308	114.0	53.6	39.3
Expenses.....	41,847,651	31,576,876	24,993,667	67.4	32.5	26.3
Services.....	10,819,881	12,770,473	10,063,262	62.2	27.8	26.9
Salaries.....	2,096,689	1,488,236	943,998	122.1	40.9	57.7
Wages.....	14,225,192	11,282,237	9,119,264	56.0	28.1	25.7
Materials.....	22,109,231	15,975,206	13,513,688	63.6	38.4	18.2
Miscellaneous.....	3,418,539	2,831,197	1,416,737	141.3	20.7	99.8
Value of products.....	47,864,630	36,629,353	27,811,187	72.1	30.7	31.7
Value added by manufacture (value of products less cost of materials).....	25,755,399	20,654,147	14,297,519	80.1	24.7	44.5

Summary, by states.—Table 2 summarizes the more important statistics by states, the states being arranged according to the value of products reported for 1909.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.		
											1909	1904	1899	1909	1904	1899	1909	1904	1899
United States...	273	25,064	100.0	1	\$47,864,630	100.0	1	\$25,755,399	100.0	1	32.8	13.7	16.8	72.1	30.7	31.7	80.1	24.7	44.5
Pennsylvania.....	38	7,220	28.8	1	13,022,617	27.2	1	8,009,847	31.1	1	149.8	56.3	59.8	206.9	77.2	73.2	237.1	73.3	94.5
Connecticut.....	30	5,217	20.8	2	10,399,860	21.7	2	5,550,877	21.6	2	7.2	1.1	6.0	37.8	20.0	14.8	43.8	17.9	22.0
New York.....	44	5,013	20.0	3	10,218,660	21.3	3	4,812,395	18.7	3	21.3	14.0	6.4	82.4	32.0	60.7	12.9	42.3	
New Jersey.....	58	4,657	18.6	4	8,825,217	18.4	4	4,713,849	18.3	4	-1.9	-18.4	20.2	22.4	-7.5	32.3	31.9	-11.3	48.7
Massachusetts.....	11	2,224	8.9	5	3,745,873	7.8	5	1,813,971	7.0	5	22.0	40.2	-13.0	42.4	61.7	-12.0	46.2	52.3	-4.0
Illinois.....	10	99	0.4	8	286,721	0.6	8	131,784	0.5	8	(²)	(²)	(²)	170.8	(²)	(²)	(²)	(²)	
All other states.....	32	634	2.5	9	1,365,632	2.9	9	722,876	2.8	9	(²)	(²)	(²)	(²)	(²)	(²)	(²)	(²)	

¹ Percentages are based on figures in Table 17. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or is less than \$100,000 for value added by manufacture.

² Industry not reported in state in 1899.

The states shown in this table are given their actual ranking among all states, the rank of certain states for which data can not be presented being higher than that of some named in the table.

The fur-felt hat industry in the United States is confined principally to a few Eastern states, the five states of Pennsylvania, Connecticut, New York, New Jersey, and Massachusetts having 231 establishments, or 84.6 per cent of the total. The value of products reported for these states in 1909 amounted to \$46,212,227, or 96.5 per cent of the total. Pennsylvania was in 1909 the most important state as measured by value of products and number of wage

earners; Connecticut was second in both 1909 and 1904; and New York ranked third in value of products at both censuses and third in wage earners in 1909. New Jersey, which was first in importance in 1904, had dropped to fourth place in 1909.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes	27,091	19,572	7,519
Proprietors and officials.....	777	735	42
Proprietors and firm members.....	264	258	6
Salaried officers of corporations.....	137	136	1
Superintendents and managers.....	376	341	35
Clerks.....	1,250	1,022	228
Wage earners (average number).....	25,064	17,815	7,249
16 years of age and over.....	24,533	17,526	7,007
Under 16 years of age.....	531	289	242

The average number of persons engaged in the fur-felt hat industry during 1909 was 27,091, of whom 25,064, or 92.5 per cent, were wage earners. Of the total number, 72.2 per cent were males and 27.8 per cent females. The average number of wage earners under 16 years of age was only 531, or 2.1 per cent of the total number of wage earners.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 17. The distribution of the average number by sex and age is not shown for the individual states, but Table 18 gives such a distribution for the number employed on December 15, or the

nearest representative day. Female wage earners were reported from all states in which the industry was located except three—Iowa, Michigan, and Mississippi.

Table 4 shows the average number of wage earners in the industry distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899. There was little change in the distribution of the employees of the industry from census to census.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Num-ber.	Per cent distrib-ution.	Num-ber.	Per cent distrib-ution.	Num-ber.	Per cent distrib-ution.
Total	25,064	100.0	22,047	100.0	18,880	100.0
16 years of age and over..	24,533	97.9	21,598	98.0	18,623	98.6
Male.....	17,526	69.9	15,432	70.0	13,187	69.8
Female.....	7,007	28.0	6,166	28.0	5,436	28.8
Under 16 years of age....	531	2.1	449	2.0	257	1.4

Wage earners employed, by months.—Table 5 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the five states in which an average of over 500 wage earners were employed during the year.

STATE.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909 ¹												
	Average num-ber during the year.	Janu-ary.	Febru-ary.	March.	April.	May.	June.	July.	August.	Septem-ber.	Octo-ber.	Novem-ber.	Decem-ber.
United States	25,064	25,987	19,394	20,361	20,660	21,075	24,538	26,676	27,588	28,216	28,276	26,972	29,062
Connecticut.....	5,217	5,880	1,940	2,188	2,283	2,472	5,330	6,856	7,109	7,289	7,266	7,045	6,941
Massachusetts.....	2,224	2,091	2,394	2,636	2,172	2,270	2,198	2,144	2,125	2,262	2,268	2,065	2,157
New Jersey.....	4,657	5,490	2,860	3,113	3,606	3,958	4,253	4,798	5,149	5,166	5,206	6,101	6,188
New York.....	5,013	4,587	4,648	4,790	4,735	4,710	4,868	5,009	5,232	5,407	5,411	5,461	5,396
Pennsylvania.....	7,220	7,229	6,956	7,026	7,072	6,956	7,169	7,163	7,260	7,361	7,358	7,521	7,699

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the industry during any month was 29,062, in December, and the smallest number 19,394, in February, the minimum number being equal to 66.7 per cent of the maximum. The statistics shown in Table 5 do not represent normal conditions because of an important strike which affected a large number of establishments in Connecticut and New Jersey. In Connecticut the strike lasted from January 16 to the middle of June, and in New Jersey for a somewhat longer period. In 1904 the maximum number, 22,840, was reported for September, and the minimum number, 20,879, for May. The minimum thus was equal to 91.4 per cent of the maximum, showing a much narrower range of variation than in 1909. The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for the principal states in Table 18.

Prevailing hours of labor.—In Table 6 the wage earners in the industry as a whole have been classified

according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

STATE.	AVERAGE NUMBER OF WAGE EARNERS: 1909					
	Total.	In establishments with prevailing hours—				
		48 and under.	Be-tween 48 and 54.	54.	Be-tween 54 and 60.	60.	Be-tween 60 and 72.
United States	25,064	2,182	7,485	5,163	8,957	773
Connecticut.....	5,217	588	3,016	22	1,468	123
Massachusetts.....	2,224	83	.....	20	2,121	.....
New Jersey.....	4,657	619	3,295	198	366	269
New York.....	5,013	672	1,060	36	3,236	9
Pennsylvania.....	7,220	65	370	4,919	1,533	333

Most of the wage earners were employed in establishments where the prevailing hours were more than 48 but less than 60. There was considerable diversity among the several states in the prevailing time of employment.

Character of ownership.—Table 7 presents data with respect to the character of ownership of the establishments in the industry for 1909 and 1904.

In 1909, of the total number of establishments, 38.1 per cent were under corporate ownership, as compared with 25.9 per cent in 1904. In 1909 the value of products of these establishments represented 66 per cent of the total, and in 1904, 55.1 per cent.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	273	216	\$47,864,630	\$36,629,353
Individual.....	108	92	5,679,082	4,418,694
Firm.....	61	68	10,678,321	12,028,079
Corporation.....	104	56	31,607,227	20,182,580
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	39.6	42.6	11.9	12.1
Firm.....	22.3	31.5	22.1	32.8
Corporation.....	38.1	25.9	66.0	55.1

Table 8 gives statistics for the establishments in the industry classified according to form of ownership, by states.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	108	61	104	2,672	4,995	17,397	\$5,679,062	\$10,678,321	\$31,607,227	\$2,778,486	5,408,625	\$17,570,288
Connecticut.....	20	16	44	248	1,034	3,935	531,682	2,120,363	7,747,795	223,714	1,112,795	4,214,368
Massachusetts.....	3	3	6	20	478	1,726	43,879	823,654	2,878,340	20,041	421,915	1,372,015
New Jersey.....	22	14	22	719	1,308	2,630	1,210,551	2,801,454	4,813,212	655,535	1,541,420	2,516,694
New York.....	24	9	11	423	641	3,949	1,558,550	1,630,879	7,029,231	559,656	852,768	3,400,071
Pennsylvania.....	17	12	9	1,166	1,262	4,792	2,039,559	2,674,955	8,308,103	1,139,637	1,163,918	5,706,292

In 1909, of the total number of wage earners reported for the industry, 2,672, or 10.7 per cent, were employed in establishments under individual ownership; 4,995, or 19.9 per cent, in those under firm ownership; and 17,397, or 69.4 per cent, in those owned by corporations.

Size of establishment.—Table 9 presents statistics for 1909 and 1904 for establishments in the fur-felt hat industry grouped according to the value of their products.

In 1909 only six establishments manufactured products valued at \$1,000,000 or over, but they reported 35 per cent of the total value of products for all establishments.

The average value of products per establishment increased from \$169,580 in 1904 to \$175,328 in 1909, but the average value added by manufacture, as computed from the figures in Table 1, decreased slightly, from \$95,621 to \$94,342; the average number of

wage earners per establishment also shows a decrease from 102 in 1904 to 92 in 1909.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	273	216	\$47,864,630	\$36,629,353
Less than \$5,000.....	35	18	104,294	61,337
\$5,000 and less than \$20,000.....	63	61	695,573	655,316
\$20,000 and less than \$100,000.....	78	60	3,639,413	3,291,900
\$100,000 and less than \$1,000,000.....	91	71	26,673,802	21,389,673
\$1,000,000 and over.....	6	6	16,751,608	11,231,127
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	12.8	8.3	0.2	0.2
\$5,000 and less than \$20,000.....	23.1	28.2	1.5	1.8
\$20,000 and less than \$100,000.....	28.6	27.8	7.6	9.0
\$100,000 and less than \$1,000,000.....	33.3	32.9	55.7	58.4
\$1,000,000 and over.....	2.2	2.8	35.0	30.7

Table 10 gives, for 1909, a classification of establishments according to the number of wage earners employed, for the industry as a whole and for the leading states.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States	273	25,064	12	71	200	56	687	47	1,597	32	2,224	31	4,600	19	6,579	2	1,102	3	8,075
Connecticut.....	80	5,217	2	17	47	12	172	17	629	13	884	14	1,983	5	1,502	.....	.....	.....	.....
Massachusetts.....	11	2,224	.....	2	3	2	31	.....	.....	4	234	1	176	1	386	.....	.....	.....	1,394
New Jersey.....	58	4,657	1	11	37	8	88	12	436	10	746	11	1,649	4	1,226	1	575	.....	.....
New York.....	44	5,013	4	13	37	8	109	9	257	4	279	.....	.....	4	1,521	1	527	1	2,283
Pennsylvania.....	38	7,220	2	7	12	13	145	6	191	1	81	3	449	5	1,944	.....	.....	1	4,398

Of the total number of wage earners, 18.8 per cent were reported by establishments employing from 1 to 100, 44.6 per cent by establishments employing from 101 to 500, and 36.6 per cent by establishments employing more than 500 wage earners. There were only 24 establishments that employed more than 250 wage earners, 3 of which employed over 1,000.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation.

Table 1 shows the total expenses reported for 1909 to have been \$41,847,651, distributed as follows: Cost of materials, \$22,109,231, or 52.8 per cent; wages, \$14,223,192, or 34 per cent; salaries, \$2,096,689, or 5 per cent; and miscellaneous expenses, made up of taxes, rent of factory or works, advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$3,418,539, or 8.2 per cent.

Engines and power.—Table 11 shows that the total amount of primary power used in the industry increased from 11,843 horsepower in 1899 to 19,245 in

1909, or 62.5 per cent. Steam and rented electric power are the leading kinds of primary power used.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	483	251	147	19,245	18,630	11,843	100.0	100.0	100.0
Owned.....	185	213	147	16,845	15,987	11,633	87.5	93.1	98.2
Steam.....	175	203	143	16,653	15,871	11,570	96.5	95.4	97.7
Gas.....	8	5	3	147	48	38	0.8	0.3	0.3
Water wheels.....	2	3	1	20	65	25	0.1	0.4	0.2
Water motors.....		2	(¹)		3	(¹)		(²)	
Other.....				25			0.1		
Rented.....	298	38	(¹)	2,400	643	310	12.5	3.9	1.8
Electric.....	298	38	(¹)	2,172	369	79	11.3	2.2	0.7
Other.....				228	274	131	1.2	1.7	1.1
Electric motors	834	340	30	6,188	2,434	861	100.0	100.0	100.0
Run by current generated by establishment.....	536	302	30	4,014	2,065	752	64.9	84.8	90.8
Run by rented power.....	298	38	(¹)	2,172	369	79	35.1	15.2	9.2

¹ Not reported. ² Less than one-tenth of 1 per cent.

Table 12 presents for 1909 statistics of the power and fuel used in the leading states.

STATE.	PRIMARY HORSEPOWER.							ELECTRIC HORSEPOWER.		FUEL USED.							
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.				Rented.		Total rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).	
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.			Other.	Anthracite (long tons).					Bituminous (short tons).
United States	208	19,245	16,845	16,653	147	20	25	2,172	228	6,188	4,014	62,704	103,370	117	31	257	43,772
Connecticut.....	68	5,619	4,589	4,464	100		25	988	42	1,333	345	1,499	33,162	39	6	169	8,478
Massachusetts.....	9	1,149	1,125	1,125				24		274	250	30	33,773				1,168
New Jersey.....	43	5,046	4,609	4,582	15	12		392	45	986	594	29,097	8,902		15	1	18,350
New York.....	30	1,451	1,114	1,110	4			252	85	314	62	4,465	7,790		9		5,525
Pennsylvania.....	31	5,335	4,951	4,925	18	8		343	41	2,924	2,581	27,526	13,608			85	7,624
All other states.....	27	645	457	447	10			173	15	355	182	87	6,135	78	1	2	4,827

The total horsepower reported for the three leading states (Connecticut, Pennsylvania, and New Jersey) in 1909 was 16,000, and formed 83.1 per cent of the total for the United States. In every state steam was the most important form of power.

Fuel consumed.—Bituminous coal was the principal class of fuel used, 103,370 short tons being consumed during 1909. Anthracite coal was the fuel second in importance in the industry, the total amount used being 62,704 long tons.

SPECIAL STATISTICS REGARDING MATERIALS AND PRODUCTS.

Materials.—Table 13 presents statistics as to the materials used in the industry for 1909, 1904, and 1899, and shows also the percentage of increase from 1899 to 1909.

The total cost of the materials used by establishments in the fur-felt hat industry in 1909 was \$22,109,231, as compared with \$15,975,206 in 1904 and \$13,513,668 in 1899, representing a gain of \$8,595,563, or 63.6 per cent, for the decade. These totals involve some duplication due to the use of the products of one establishment, especially hat bodies and hats in the rough, as materials

for another. Hatters' fur is the principal material used, and its cost formed 42 per cent of the total cost of materials in 1909 and 47.2 per cent in 1899. The quantity reported for 1909 was 40.2 per cent greater than that for 1899. The number of fur-felt hat bodies and hats in the rough purchased increased 174.2 per cent during the decade. The cost of "all other materials," amounting to \$9,411,474 in 1909, includes the cost of leather bands, bindings, hat wires, and other trimmings, as well as of the cases required for packing and shipping the products.

Table 13	MATERIALS.			
	1909	1904	1899	Per cent of increase: 1899-1909
Total cost.....	\$22, 109, 231	\$15, 975, 206	\$13, 513, 668	63. 6
Hatters' fur:				
Pounds.....	8, 645, 576	6, 718, 359	6, 166, 269	40. 2
Cost.....	\$9, 278, 922	\$6, 743, 936	\$6, 376, 991	45. 5
Fur-felt hat bodies and hats in the rough:				
Dozens.....	406, 447	211, 760	148, 212	174. 2
Cost.....	\$2, 575, 248	\$1, 351, 372	\$882, 986	191. 7
Chemicals and dyestuffs.....	\$843, 587	\$1, 140, 281	\$656, 794	28. 4
All other materials.....	\$9, 411, 474	\$6, 739, 617	\$5, 596, 897	68. 2

Table 14 shows, for the principal states in the industry, the quantity of hatters' fur and of hat bodies and hats in the rough used in 1909, 1904, and 1899, together with their cost and that of all other materials for 1909.

Table 14	MATERIALS.			
	Quantity.			Cost: 1909
	1909	1904	1899	
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	
Total.....				\$22, 109, 231
Hatters' fur.....	8, 645, 576	6, 718, 359	6, 166, 269	9, 278, 922
Connecticut.....	1, 673, 332	1, 385, 325	1, 499, 767	1, 909, 915
Massachusetts.....	1, 047, 438	547, 494	456, 593	766, 956
New Jersey.....	1, 817, 020	1, 880, 510	1, 897, 113	2, 115, 407
New York.....	1, 883, 207	1, 563, 680	1, 281, 452	1, 860, 052
Pennsylvania.....	1, 976, 118	1, 227, 951	817, 311	2, 420, 635
All other states.....	248, 461	113, 409	214, 033	205, 957
Fur-felt hat bodies and hats in the rough.....	<i>Dozens.</i> 406, 447	<i>Dozens.</i> 211, 760	<i>Dozens.</i> 148, 212	2, 575, 248
Connecticut.....	87, 117	30, 783	61, 726	491, 161
Illinois.....	12, 993	6, 640	.....	121, 850
Massachusetts.....	29, 979	3, 289	29, 338	181, 135
New Jersey.....	29, 156	40, 992	22, 711	153, 215
New York.....	194, 268	92, 984	24, 620	1, 250, 824
Pennsylvania.....	26, 984	23, 512	5, 045	175, 642
All other states.....	25, 950	13, 560	4, 772	201, 421
All other materials.....				10, 255, 061

Products.—Table 15 gives the quantity and value of the products of the fur-felt hat industry in 1909, 1904, and 1899, and the percentage of increase from 1899 to 1909.

Fur-felt hats or bodies and hats in the rough to the value of \$806,601 were manufactured during 1909 by establishments engaged chiefly in the production of straw hats, woolen goods, and millinery and lace goods.

Table 15	PRODUCTS.			
	1909	1904	1899	Per cent of increase: 1899-1909
Total value.....	\$47, 864, 630	\$36, 629, 353	\$27, 811, 167	72. 1
Fur-felt hats:				
Dozens.....	2, 989, 252	2, 611, 875	1, 882, 372	58. 8
Value.....	\$43, 442, 466	\$34, 314, 234	\$25, 385, 506	71. 1
Fur-felt hat bodies and hats in the rough:				
Dozens.....	366, 370	88, 986	165, 010	122. 0
Value.....	\$2, 703, 738	\$660, 959	\$902, 730	172. 4
All other products, value.....	\$1, 164, 872	\$1, 093, 361	\$941, 032	23. 8
Work on materials for others.....	\$553, 554	\$560, 799	\$491, 919	12. 5

¹ In addition, fur-felt hats, to the value of \$306,601 in 1909, and to the value of \$333,441 in 1904, were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

The value of products of establishments in the fur-felt hat industry increased 72.1 per cent between 1899 and 1909. The number of finished hats increased 1,106,880 dozens, or 58.8 per cent, during the decade, while their value increased \$18,056,960, or 71.1 per cent. The increase in output was greater from 1899 to 1904 than during the next five years. From 1899 to 1904 there was a decrease in the production of hat bodies and hats to be sold in the rough, but there was a great increase from 1904 to 1909.

Table 16 shows the output of the principal products for 1909, 1904, and 1899, and the value for 1909, for the principal states.

Table 16	PRODUCTS.				
	PRODUCT AND STATE.	Quantity (dozens).			Value: 1909
		1909	1904	1899	
Total.....				\$47, 864, 630	
Fur-felt hats.....	2, 989, 252	2, 611, 875	1, 882, 372	43, 442, 466	
Connecticut.....	530, 553	600, 312	497, 683	7, 853, 882	
Illinois.....	13, 286	.....	.....	255, 331
Massachusetts.....	320, 587	234, 792	227, 032	3, 544, 067	
New Jersey.....	579, 596	676, 906	590, 939	8, 121, 205	
New York.....	776, 258	631, 374	226, 061	9, 465, 282	
Pennsylvania.....	688, 696	413, 506	280, 880	12, 943, 334	
All other states.....	100, 271	54, 985	69, 777	1, 254, 365	
Fur-felt hat bodies and hats in the rough.....	366, 370	88, 986	165, 010	2, 703, 738	
Connecticut.....	335, 947	63, 678	.....	2, 407, 044
All other states.....	30, 423	25, 310	11, 822	296, 694	
All other products, including custom work.....				1, 718, 426	

DETAILED STATE TABLES.

The principal data secured by the census inquiry concerning the manufacture of fur-felt hats are presented by states in Tables 17 and 18.

Table 17 shows for 1909, 1904, and 1899 the number of establishments, number of persons engaged in the

industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 18 gives more detailed statistics for the industry for 1909 only.

SILK MANUFACTURES

SILK MANUFACTURES.

GENERAL STATISTICS.

Scope of the industry.—The silk manufacturing industry, according to the classification adopted for the presentation of the statistics of manufactures at the census of 1909, includes two classes of establishments, as follows: (1) Establishments manufacturing finished silk products, such as woven fabrics, braids, and trimmings, sewing, embroidery, and wash silks, machine twist, and fringe and floss silks; and (2) establishments manufacturing silk yarn, known technically as organzine, tram, and spun silk.¹ The concerns engaged only in the manufacture of organzine and tram are known as throwsters and winders, the latter performing the work of winding the threads on skeins and spools after they have been washed free from the gum which encases the raw fibers. In most cases it has not been deemed necessary to give separate statistics regarding the two branches of the industry, and except where otherwise stated the tables in this report present statistics only for the industry as a whole. The statistics for the industry do not cover the general manufacture of silk hosiery and knit goods, since establishments engaged primarily in such manufactures are included with the hosiery and knit goods industry. The total value of silk hosiery and knit underwear produced in all industries, so far as these figures are available, is, however, presented in Table 28.

Summary for the industry: 1909.—Table 1 presents a summary of the statistics for the silk manufacturing industry as a whole for 1909.

Few establishments include the entire process of silk manufacture in their operations, almost three-fourths of the total quantity of organzine and tram reported for 1909 being thrown under contract by independent throwsters. Although the establishments engaged solely in throwing, winding, etc., formed more than one-fifth of the total number of establishments in the industry and employed almost one-sixth of the total number of wage earners, they reported only 5.2 per cent of the total cost of materials and 6.5 per cent of the total value of products. This is due to the fact that the establishments operating on a commission basis did not include the value of the silk thrown, which belonged to the establishments for which the work is done, the cost of materials for the establishment throwing the

¹ Organzine and tram constitute respectively the warp and the weft of silk fabrics, and are made from the best grades of the raw material by the process of throwing (doubling, twisting, and winding the filaments into yarn). Spun silk is produced by spinning, in much the same manner as wool fabrics are spun, the short-fibered silk from pierced cocoons or from waste silk of any sort which can not be thrown in the usual manner.

silk consisting of the cost of mill supplies, fuel, etc., and the value of products mainly represents the amount received for the work performed. The establishment for which the throwing was done reported the cost of the thrown silk in its cost of materials and the amount paid for throwing as contract work under miscellaneous expenses.

	Total.	Establishments engaged primarily in—		Per cent of total.	
		Manufacturing finished silk products.	Throwing, etc., only (throwsters).	Finished silk products.	Throwsters.
Number of establishments.....	852	660	192	77.5	22.5
Persons engaged in the industry.....	105,238	88,567	16,671	84.2	15.8
Proprietors and firm members.....	664	536	128	80.7	19.3
Salaried employees.....	5,537	4,958	579	89.5	10.5
Wage earners (average number).....	99,037	83,073	15,964	83.9	16.1
Primary horsepower.....	97,947	(1)	(1)	.....	.....
Capital.....	\$152,158,002	\$137,555,737	\$14,602,265	90.4	9.6
Expenses.....	177,175,719	165,880,356	11,295,363	93.6	6.4
Services.....	46,097,364	41,409,408	4,687,956	89.8	10.2
Salaries.....	7,527,279	6,771,262	756,017	90.0	10.0
Wages.....	38,570,085	34,638,146	3,931,939	89.8	10.2
Materials.....	107,706,916	102,177,570	5,529,346	94.8	5.2
Miscellaneous.....	23,311,439	22,293,378	1,018,061	95.0	4.4
Contract work.....	12,008,744	11,726,868	281,876	97.7	2.3
All other.....	11,302,695	10,566,510	736,185	93.5	6.5
Value of products.....	196,911,667	184,099,555	12,812,112	93.5	6.5
Value added by manufacture (value of products less cost of materials).....	89,144,751	81,921,985	7,222,766	91.9	8.1

¹ Figures not available.

NOTE.—The 852 establishments comprise 468 corporations, the officers of which are included under salaried employees. Proprietors and firm members pertain to individual and firm establishments (see Table 16).

Wages paid in dyeing, printing, finishing, embossing, etc., by establishments outside of the classified silk industry are reported elsewhere and appear here largely in the value of materials (see Table 3). Contract work is chiefly labor expended upon materials in other mills, and value added by manufacture does not include value added to materials by establishments elsewhere reported (see Tables 4 and 6).

For duplications in value of products see Tables 4 and 6, and for value of products used in other industries, Table 25.

Table 2 shows another classification of the two branches of the industry, for mills manufacturing the finished products and for plants reporting as engaged exclusively in throwing, winding, etc.

CLASS.	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
Total.....	852	99,037	\$38,570,085	\$107,706,916	\$196,911,667	\$89,144,751
Mills making finished products.....	637	81,391	34,023,194	99,679,000	179,765,675	80,080,675
Mills doing throwing, winding, etc.....	215	17,646	4,546,891	8,087,916	17,145,992	9,058,076

The silk goods constituting the final products of the industry are to a considerable extent dyed and finished in establishments included in the industry designated "dyeing and finishing textiles," and a comprehensive view of the silk manufacturing industry should cover also such dyeing and finishing of silk goods in independent dyeing and finishing establishments. It is not possible, however, to give complete statistics on this subject, as the returns of the independent dyeing and finishing establishments do not in all cases indicate the kind of goods treated; of the 426 establishments included under the industry "dyeing and finishing textiles," however, the returns show 69 to have been engaged primarily in the dyeing and finishing of silk goods, and the principal statistics for these establishments are summarized in Table 3.

Table 3

	Independent dyeing and finishing establishments engaged primarily in dyeing and finishing silk goods.
Number of establishments.....	69
Persons engaged in the industry.....	8,860
Proprietors and firm members.....	39
Salaried employees.....	514
Wage earners (average number).....	8,307
Primary horsepower.....	13,067
Capital.....	\$17,336,210
Expenses.....	12,273,237
Services.....	5,400,120
Salaries.....	1,045,760
Wages.....	4,354,360
Materials.....	5,814,716
Miscellaneous.....	1,058,401
Value of products.....	13,970,978
Value added by manufacture (value of products less cost of materials).....	8,156,262

The figures for expenses for the silk manufacturing industry as a whole involve considerable duplication. The figures for miscellaneous expenses shown in Table 1 include \$12,008,744, representing payments for contract work, a large part of which was made to other establishments in the industry for throwing organzine and tram or dyeing and finishing silk goods for the establishments reporting the payments. The establishments to which these payments were made, on the other hand, paid out the greater part of the amounts thus received for wages, materials, and other expenses, thus occasioning a duplication in the total expenses reported for the industry. Similarly, the establishments doing throwing or dyeing and finishing under contract reported the amounts received for this work in their value of products, while the cost of such contract work is one of the elements entering into the value of products of the establishments for which the work was done, so that a duplication thus arises in the total value of products for the industry as a whole.

It is impossible to determine the exact amount of duplication arising from the causes mentioned, since no segregation can be made between the amounts reported as received for contract work by establishments within the industry and the receipts for work done for merchants and for establishments in other industries, and no segregation can be made between

the two classes of receipts. It is believed, however, that the amounts received for contract work from concerns not engaged in the silk manufacturing industry were comparatively small, so that the total amount reported as received for contract work by establishments within the industry (\$8,364,350, of which \$6,745,261 was reported by throwsters or by weaving mills also doing contract throwing) would represent approximately the amount of duplication in expenses and value of products resulting from this factor, although the actual duplication might be somewhat less. The difference (\$3,644,394) between payments and receipts for contract work within the industry would then represent the payments for such work to establishments outside the industry.

Duplication also arises in the cost of materials and value of products for this industry from the fact that some establishments within the industry sell partly manufactured products, such as organzine, tram, spun silk, and fringe and floss, to other establishments in the industry for use as materials in further manufacturing processes. The value of such products is, of course, included in the value of products of the establishments reporting them, and also enters into the value of products of the establishments using them as materials, while the cost of the materials from which they were made constitutes part of the cost of materials of the establishment manufacturing them, and also enters into the cost of materials of the establishments using these products as materials for further manufacture. As the total amount of this class of products reported as purchased for use as materials exceeds the amount reported as sold, the value of the latter (\$15,055,625) may be assumed to represent approximately the amount of duplication in the total value of products for the industry, although, as some of these products were sold to concerns outside the industry, the actual amount of duplication was less; the error, however, is comparatively small. The actual duplication in cost of materials was somewhat less than the figure just given, which includes the value added to the raw materials by manufacture in the establishments transforming them into the partly manufactured products, but it is impossible to determine the exact amount, as no segregation can be made in the returns between the materials entering into these products and those on which all the manufacturing processes to which they were subjected within the industry were performed in the same establishment. At the same time it should be noted that the amount obtained by subtracting the figure given above from the total cost of materials for the industry is more significant than that which would be obtained by merely eliminating the actual duplication, for the reason that it more nearly represents the original cost of the materials transformed by the manufacturing processes performed within the industry.

The extent to which the duplications referred to affect the value of products for the industry is brought out by Table 4, which shows the total value of products, the approximate amount of duplication arising from the causes mentioned, and the net value of products, eliminating the duplication.

	VALUE OF PRODUCTS OF SILK MANUFACTURING INDUSTRY: 1909	
	Amount.	Per cent of total.
Total value of products.....	\$198,911,867	100.0
Duplications.....	23,419,975	11.9
Resulting from sale of partly finished products to other establishments in the industry for use as materials.....	15,055,625	7.6
Organzine and tram.....	12,550,510	6.4
Spun silk.....	2,104,066	1.1
Fringe and floss.....	401,049	0.2
Resulting from contract work.....	8,364,350	4.3
Net value of products.....	173,491,692	88.1

Comparison with earlier censuses.—Table 5 summarizes the statistics of the industry as a whole for

each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Statistics for the silk manufacturing industry were first obtained at the census of 1849, when 67 establishments, employing an average of 1,723 hands, and manufacturing products valued at \$1,809,476, were reported. At the census of 1859, 139 establishments were reported, giving employment to an average of 5,435 hands, and manufacturing products valued at \$6,607,771. The figures for 1869 include those for establishments that reported silk hose and silk knit goods as their products of chief value, while such establishments are now classified under the hosiery and knit goods industry. As the business of such establishments was comparatively small in volume, this inclusion does not materially affect the comparability of the figures for the different censuses.

	SILK MANUFACTURING INDUSTRY.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	852	624	483	(²) 472	(²) 382	(²) 86	76.4	36.5	29.2	2.3	23.6	344.2
Persons engaged in the industry.....	105,238	84,153	68,550	(²)	(²)	(²)	53.5	25.1	22.8	.....	.....	.....
Proprietors and firm members.....	664	525	477	(²)	(²)	(²)	39.2	26.5	10.1	.....	.....	.....
Salaried employees.....	5,537	4,027	2,657	(²)	(²)	(²)	108.4	37.5	51.6	.....	.....	.....
Wage earners (average number).....	99,037	79,601	65,418	49,382	31,337	6,649	51.4	24.4	21.7	(²)	(²)	(²)
Primary horsepower.....	97,947	71,760	57,397	29,638	8,810	1,911	70.6	36.5	25.0	93.7	236.4	361.0
Capital.....	\$152,158,002	\$109,556,621	\$81,082,201	\$51,007,537	\$19,125,300	\$6,231,130	87.7	38.9	35.1	59.0	166.7	206.9
Expenses.....	177,175,719	121,424,178	96,787,419	74,944,366	(²)	(²)	83.1	45.9	25.5	29.1	.....	.....
Services.....	46,097,364	31,510,213	24,116,546	19,630,318	9,146,705	1,942,286	91.1	46.3	30.7	22.5	115.2	370.9
Salaries.....	7,527,279	4,742,270	3,134,352	(²)	(²)	(²)	140.2	58.7	51.3	.....	.....	.....
Wages.....	38,570,085	26,767,943	20,982,194	(²)	(²)	(²)	83.3	44.1	27.6	.....	.....	.....
Materials.....	107,766,916	75,861,188	62,406,665	51,004,425	22,467,701	7,817,559	72.7	42.1	21.6	22.4	127.0	187.4
Miscellaneous.....	23,311,439	14,052,777	10,264,208	4,259,623	(²)	(²)	127.1	65.9	36.9	141.0	.....	.....
Value of products.....	196,911,667	133,288,072	107,256,258	87,298,454	41,033,045	12,210,662	83.6	47.7	24.3	22.9	112.8	236.0
Value added by manufacture (value of products less cost of materials).....	89,144,751	57,426,884	44,849,593	36,294,029	18,565,344	4,393,103	98.8	55.2	28.0	23.6	95.5	322.6

¹ Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

NOTE.—See note to Table 1.

Almost ten times as many establishments and almost fifteen times as many wage earners were reported for the silk manufacturing industry in 1909 as in 1869, while the value of products in the later year was more than sixteen times as great, and the value added by manufacture more than twenty times as great as that reported forty years previous. The percentages of increase in the two items first mentioned were actually even greater than those based on the figures in the table, owing to the fact, already noted, that the financial figures for 1869 were reported in a depreciated currency. The greatest relative growth took place during the first half of the period, the value of products more than trebling during the decade 1869-1879 and more than doubling during the following decade.

The development of the industry during the decade 1899-1909 was much more rapid than during the preceding decade, the number of establishments

increasing 76.4 per cent, the number of wage earners 51.4 per cent, and the value of products 83.6 per cent. For practically every item shown in the table the increase was greater during the second half of the decade than during the first, nearly three-fourths of the total increase in value of products between 1899 and 1909 taking place during the five-year period 1904-1909.

In making comparisons between the value of products, cost of materials, and certain other items, as reported for the different censuses, account should be taken of the fact, already mentioned, that these items contain more or less duplication, the extent of which varied at different censuses. As shown by Table 4, the duplication in value of products for 1909 was approximately \$23,419,475, or 11.9 per cent of the total value of products for the industry. At prior censuses the method employed in estimating duplications in cost of materials and value of products ("materials

and products twice included") differed to some extent from that by which the figures presented in Table 4 were obtained, being as follows:

(1) The cost of organzine and tram reported as materials and the value of that reported as products were deducted from the cost of materials and value of products, respectively. (2) The value of the spun silk reported as a product was deducted both from the cost of materials and the value of products. (3) The cost of fringe and floss reported as materials was deducted both from the cost of materials and the value of products. (4) The amount received for contract work was deducted from the value of products.

Table 6 shows for each census from 1889 to 1909, inclusive, the total cost of materials and value of products, as reported, the cost of materials and value of products twice included, as determined by the above method, and the net cost of materials and value of products, eliminating these duplications.

The value of products in 1909, exclusive of duplications, differs somewhat from the net value of products shown in Table 4, on account of the fact that the cost of all fringe and floss purchased was treated as duplication in Table 6, instead of the value of that sold by the mills within the industry.

The relative duplication in cost of materials and value of products has not varied to any great extent

at the last three censuses. Between 1889 and 1899, however, it appears to have decreased considerably, possibly indicating that during this decade there was a tendency to concentrate all the processes of manufacture in the same establishment.

Table 6

	SILK MANUFACTURING INDUSTRY.			
	1909	1904	1899	1889
MATERIALS.				
Total cost, as reported.....	\$107,766,916	\$75,861,188	\$62,406,665	\$51,004,425
Cost of materials twice included.....	18,420,972	16,400,231	11,840,267	15,537,520
Per cent of total.....	17.1	21.3	19.0	30.5
Cost of materials, exclusive of duplication.....	89,345,944	59,460,957	50,566,398	35,466,905
Per cent of increase over preceding census.....	50.3	17.6	42.6	.....
PRODUCTS.				
Total value, as reported.....	196,911,667	133,288,072	107,256,258	87,298,454
Value of products twice included.....	24,656,113	14,754,512	14,805,046	18,143,855
Per cent of total.....	12.5	11.1	13.8	20.8
Value of products, exclusive of duplications.....	172,255,554	118,533,560	92,451,212	69,154,599
Per cent of increase over preceding census.....	45.3	28.2	33.7	.....

Summary, by states.—Table 7 summarizes the more important statistics of the industry as a whole, by states, the states being arranged according to the value of products reported for 1909. Some states for which data can not be shown separately ranked higher than some named in the table.

Table 7

STATE.	Number of establishments: 1909	SILK MANUFACTURING INDUSTRY.																			
		Wage earners.			Value of products.				Value added by manufacture.				Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.		
							1909	1904			1909	1904	1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States.....	852	99,037	100.0	.....	\$196,911,667	100.0	.....	\$89,144,751	100.0	.....	51.4	24.4	21.7	83.6	47.7	24.3	98.6	55.2	28.0
New Jersey.....	348	30,285	30.6	2	65,429,550	33.2	1	32,164,373	36.1	1	25.4	18.9	5.5	63.7	52.6	7.2	75.4	56.7	11.9		
Pennsylvania.....	226	36,469	36.8	1	62,061,302	31.5	2	26,895,731	30.2	2	73.4	35.5	23.0	99.7	57.8	26.6	140.4	78.5	34.7		
New York.....	170	12,903	13.0	3	26,518,821	13.5	3	12,570,232	14.1	3	64.1	14.4	43.5	108.7	31.4	58.8	104.9	29.7	57.9		
Connecticut.....	47	8,703	8.8	4	21,062,687	10.7	4	9,228,342	10.4	4	33.6	11.7	19.6	70.2	34.8	26.2	78.1	41.4	28.0		
Massachusetts.....	19	4,109	4.1	5	8,942,246	4.5	5	3,512,395	3.9	5	32.1	26.0	4.9	50.1	27.5	17.7	64.6	23.0	33.8		
Rhode Island.....	13	1,685	1.7	6	4,584,431	2.3	6	1,396,746	1.6	6	270.3	30.5	183.7	249.6	79.3	95.0	133.7	62.3	74.8		
Virginia.....	7	819	0.8	8	1,543,723	0.8	8	532,830	0.6	8	73.2	.....	.....	57.3	.....	.....	104.0	.....	.....
Maryland.....	4	655	0.7	10	511,968	0.3	12	275,339	0.3	12	.....	274.3	.....	.....	87.5	.....	.....	.....	.....
Delaware.....	3	218	0.2	13	255,434	0.1	14	103,913	0.1	14	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	15	3,191	3.2	.....	6,001,505	3.0	.....	2,464,850	2.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 39. Percentage not shown where comparative figures can not be given without disclosing individual operations.

The silk manufacturing industry is confined to 17 states, all of which, with the exception of California, which reported three establishments, are located east of the Mississippi River, while 16 establishments, located in Maryland, Virginia, North Carolina, and Georgia, represent the extent of the industry in the southern states. New Jersey is the most important state in the industry, ranking first at the censuses of 1909 and 1904 in value of products, with about one-third (33.2 per cent) of the total for the United States, and in value added by manufacture, but second at both censuses in the number of wage earners. The

number of wage earners employed in the silk manufacturing industry of the state increased 25.4 per cent during the decade ending with 1909, and the value of products increased 63.7 per cent. Pennsylvania, which ranked second in value of products, showed larger relative gains from 1899 to 1909 than New Jersey in all three items for which the percentages of increase are given in the table, and outranked the latter state at the censuses of 1909 and 1904 in the number of wage earners employed. This latter condition is caused by the fact that many establishments in Pennsylvania are engaged in throwing raw silk into

organzine and tram for use in establishments outside the state, and since these establishments confine their operations for the most part to contract work, their value of products does not include the value of the organzine and tram produced, but consists mainly of the amount received for work done. New Jersey and Pennsylvania together reported about two-thirds of the total number of wage earners and total value of products for the industry in 1909. New York ranked third in number of wage earners, value of products, and value added by manufacture in 1909 and 1904. Rhode Island, while not an important state in the industry as measured by value of products, shows the largest percentages of increase from 1899 to 1909 of any of the states for which figures are given in the

table, the gain in the number of wage earners being 270.3 per cent, that in value of products 249.6 per cent, and that in value added by manufacture 183.4 per cent.

In general, the states held the same or nearly the same rank in respect to number of wage earners, value of products, and value added by manufacture, in 1909 as in 1904, and all of the states had the same rank in value added by manufacture in 1909 as in value of products.

Table 8 shows, for the six leading states for 1909, the total cost of materials and value of products as reported, the amount of duplication in these items, and the cost of materials and value of products less duplications.

	Connecticut.	Massachusetts.	New Jersey.	New York.	Pennsylvania.	Rhode Island.
MATERIALS.						
Total cost, as reported.....	\$11,834,345	\$5,429,851	\$33,265,177	\$13,948,589	\$35,165,571	\$3,187,685
Cost of materials twice included.....	\$2,080,543	\$696,154	\$4,907,124	\$2,394,415	\$7,644,809	\$303,618
Per cent of total.....	17.6	12.8	14.8	17.2	21.7	9.5
Cost of materials, exclusive of duplication.....	\$9,753,802	\$4,733,697	\$28,358,053	\$11,554,174	\$27,520,762	\$2,884,067
PRODUCTS.						
Total value, as reported.....	\$21,062,687	\$8,942,246	\$65,429,550	\$26,518,821	\$62,061,302	\$4,584,431
Value of products twice included.....	\$2,835,491	\$752,814	\$3,684,260	\$2,883,141	\$12,006,069	\$155,394
Per cent of total.....	13.5	8.4	5.6	10.9	19.3	3.4
Value of products, exclusive of duplication.....	\$18,227,196	\$8,189,432	\$61,745,290	\$23,635,680	\$50,055,233	\$4,429,037

In many instances the partially manufactured products of one state go to another state to be completed; hence, in some states, the gross value of products may be a better indication of the magnitude of the industry than the value less products twice included. The gross value of the products of Pennsylvania, \$62,061,302, is relatively much nearer the total value of its silk manufactures than the value less products twice included, \$50,055,233, because a considerable portion of the silk thrown by independent throwsters in Pennsylvania (three-fifths of the total for the United States) does not appear in the value of products for that state, but is used as materials in other states, where it becomes a part of the total value of the finished products.

PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 9 shows, for 1909, the number of persons engaged in the industry as a whole, classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the silk manufacturing industry during 1909 was 105,238, of whom 99,037, or 94.1 per cent, were wage earners, 2,236, or 2.1 per cent, proprietors and officials, and 3,965, or 3.8 per cent, were clerks, this class including subordinate salaried employees. Of the total number

63,022, or 59.9 per cent, were females, of whom 62,015, or 98.4 per cent, were wage earners. The number of female wage earners represented 62.6 per cent of the total number of wage earners in the industry, and the number of children under 16 years of age (7,878) represented 8 per cent, more than two-thirds of the latter (69.5 per cent) being girls.

CLASS.	PERSONS ENGAGED IN THE SILK MANUFACTURING INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	105,238	42,216	63,022
Proprietors and officials.....	2,236	2,134	102
Proprietors and firm members.....	664	638	26
Salaried officers of corporations.....	480	469	11
Superintendents and managers.....	1,092	1,027	65
Clerks.....	3,965	3,060	905
Wage earners (average number).....	99,037	37,022	62,015
16 years of age and over.....	91,159	34,620	56,539
Under 16 years of age.....	7,878	2,402	5,476

In connection with these figures it may be noted that in 1869 children represented 20.8 per cent of the total number of operatives engaged in the industry, most of them being employed as spinners and winders, while the census of 1909 shows a tendency to eliminate children as wage earners, most of those reported being employed in the throwing of organzine and tram.

In order to compare the distribution of the persons engaged in the industry according to occupational status in 1909 with that in 1904 it is necessary to use

the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 10.

CLASS.	PERSONS ENGAGED IN THE SILK MANUFACTURING INDUSTRY.					
	1909		1904		Percent of increase: 1904-1909	
	Number.	Per cent distribution.	Number.	Per cent distribution.		
Total.....	105,238	100.0	84,153	100.0	25.1	
Proprietors and firm members...	664	0.6	525	0.6	26.5	
Salaried employees.....	5,537	5.3	4,027	4.8	37.5	
Wage earners (average number)...	99,037	94.1	79,601	94.6	24.4	

Table 11 shows the average number of wage earners in the silk manufacturing industry, distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE SILK MANUFACTURING INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	99,037	100.0	79,601	100.0	85,416	100.0
16 years of age and over...	91,159	92.0	72,235	90.7	59,003	90.2
Male.....	34,620	35.0	27,037	34.0	24,206	37.0
Female.....	56,539	57.0	45,198	56.8	34,797	53.2
Under 16 years of age.....	7,878	8.0	7,366	9.3	6,413	9.8

The average number of wage earners in each state in 1909, 1904, and 1899 is given in Table 39. The distribution of the average number by sex and age is not shown for the individual states, but Table 40 gives such a distribution of the number employed on December 15, 1909, or the nearest representative day. Female wage earners were reported from all the states in which the industry was carried on, and in every case exceeded the males in number. The largest number, 25,940, or 40.5 per cent of the total for the industry in the United States, was reported for Pennsylvania, and the next largest number, 17,316, for New Jersey. The four leading states, as measured by value of products, New Jersey, Pennsylvania, New York, and Connecticut, together employed 56,636 female wage earners, or almost nine-tenths (88.4 per cent) of the total number for the United States. Wage earners under 16 years of age were reported from 15 states; the largest number, 5,140, were in Pennsylvania, in which state they represented 13.8 per cent of the total number of wage earners in the industry. Of the states shown in Table 40, the proportion of children employed was highest in Maryland, where they represented 28.2 per

cent of the total number of wage earners in the industry, and lowest in New York, where they constituted 2.5 per cent.

Wage earners classified according to nature of employment.—Table 12 shows for the United States as a whole, for 1909 and 1904, and for selected states for 1909, the distribution by age, and in the case of those 16 years of age and over by sex also, of spinners, weavers, and all other wage earners. It should be noted that the absolute figures for the two censuses are not strictly comparable, owing to the fact that the numbers shown for 1904 are computed averages for the entire year, while those for 1909 are the numbers reported for December 15, or the nearest representative day. The difference between the number of wage earners on this day and the average number for the year 1909, however, was only 3,332, or 3.3 per cent of the total; and since there is little variation in the proportion of the different classes of employees, the figures representing the per cent distribution may be taken as fairly comparable.

While the number of weavers increased between 1904 and 1909, there was a decrease in the proportion which they represented of the total number of wage earners employed. Female weavers outnumbered the males in the weaving of broad silks, while in the weaving of ribbons, velvets, and plushes, men predominated.

The total number of spinners, including winders, warpers, etc., increased from 33,514 in 1904 to 49,700 in 1909, or 48.3 per cent, the number of adult males increasing 57.7 per cent, the number of adult females 51.5 per cent, and the number of children 24.2 per cent.

The relative number of spinners and weavers varied considerably in the different states. In only one of the five states shown separately in the table (New Jersey) did the number of weavers exceed the number of spinners. In Massachusetts, 58.7 per cent of the wage earners were spinners, while in Connecticut such operators constituted only 32.8 per cent of the total. Of the total male wage earners 16 years of age or over in 1909, somewhat more than one-half (53 per cent) were weavers and about one-third (31.1 per cent) spinners, the proportion of weavers having decreased somewhat during the decade 1899-1909, while the proportion of spinners increased slightly. In the case of women wage earners, the proportions are practically reversed, about one-third (33.3 per cent) of the total number being weavers and more than one-half (54.9 per cent) spinners; comparatively little change in the percentages took place during the decade. Of the children somewhat more than three-fourths (79.3 per cent) were spinners.

Nearly two-thirds (64.6 per cent) of the spinners reported for the United States as a whole in 1909 were women, the proportion being approximately the same at each of the two preceding censuses. Women were in the majority in this class of wage earners in each of the states shown in the table, the percentage which they formed of the total ranging from 60.4 in Massachusetts to 78.3 in Connecticut. The weavers were almost equally divided between adults of the two sexes; in Pennsylvania and Massachusetts, however, more than half of the weavers were women, the proportions being 59.6 per cent and 56.2 per cent, respectively, as compared with 41.4 per cent in Connecticut. Women formed a somewhat larger proportion of the total number of weavers in the industry in 1909 than in 1899, although there was a slight decrease in the percentages between 1904 and 1909. Of the wage earners included under the head of "All other" in 1909, over one-half were women.

Children are of importance only among the spinners of whom they formed about one-eighth (13 per cent) in 1909; this relatively high percentage was, however, mainly due to conditions in Pennsylvania, where about one-fifth (20.4 per cent) of the spinners were children, this class in fact outnumbering the adult males reported as spinners, and in Massachusetts, where the proportion was 15.6 per cent; in the other states shown in the table the proportion of children among the spinners was small. Children formed a somewhat smaller proportion of the total number of spinners in the industry in 1909 than in either 1904 or 1899.

Wage earners employed, by months.—Table 14 gives the number of wage earners employed in the silk manufacturing industry on the 15th (or the nearest representative day) of each month during the year 1909 for nine of the leading states in which an average of 500 or more wage earners were employed during the year.

Table 14

WAGE EARNERS EMPLOYED IN THE SILK MANUFACTURING INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		United States	89,037	87,170	99,473	100,753	100,314	99,212	97,782	86,534	98,351	99,528	66,629	89,409	100,294
Connecticut.....	8,703	<i>8,370</i>	8,459	8,581	8,517	8,526	8,594	8,725	8,877	9,248	8,788	8,855	8,896
Maryland.....	655	<i>593</i>	675	693	717	670	653	683	710	688	582	555	657
Massachusetts.....	4,109	<i>3,745</i>	3,887	4,060	4,114	4,096	4,138	3,844	4,155	4,274	4,359	4,264	4,370
New Jersey.....	30,285	<i>30,040</i>	30,653	30,951	30,817	30,415	29,787	29,786	29,834	30,054	30,349	30,264	30,530
New York.....	12,903	<i>13,044</i>	13,532	13,616	13,166	12,672	12,139	11,786	12,393	12,789	13,229	13,187	13,353
North Carolina.....	739	<i>721</i>	718	715	745	757	750	752	788	761	725	716	717
Pennsylvania.....	36,469	<i>35,775</i>	36,457	36,964	37,031	36,917	36,761	36,203	36,260	36,480	36,265	36,159	36,356
Rhode Island.....	1,685	<i>1,462</i>	1,522	1,553	1,570	1,583	1,521	1,679	1,866	1,796	1,878	1,908	1,893
Virginia.....	819	<i>808</i>	798	809	824	815	802	810	829	823	803	835	869

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the silk mills during any month of 1909 was 100,753, in March, and the smallest number, 96,534, in July, the minimum number being equal to 95.8 per cent of the maximum. The industry is not subject to any noticeable seasonal variations. In 1904 the maximum number of wage earners, 82,724, was reported for December, and the minimum number, 76,587, for January, the latter number being equal to 92.6 per cent of the former.

Prevailing hours of labor.—In Table 15 the wage earners in the silk manufacturing industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Nearly all (95.2 per cent) of the wage earners employed in the silk manufacturing industry in 1909 were in mills where the prevailing hours exceeded 54

per week, the great majority, 82.2 per cent of the total, being employed in establishments where the prevailing hours were between 54 and 60 per week. This was the most common working time, likewise, in all but two of the individual states for which figures are given in Table 15. In Maryland, however, all the wage earners, and in North Carolina the majority, were employed in establishments operating 60 hours.

Table 15

AVERAGE NUMBER OF WAGE EARNERS IN THE SILK MANUFACTURING INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—				
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.
		United States	99,037	106	2,320	2,323	81,407	12,881
Connecticut.....	8,703				8,064	639
Maryland.....	655					655
Massachusetts.....	4,109	1	39		4,069	
New Jersey.....	30,285	42	477	190	29,448	126
New York.....	12,903	32	1,305	1,042	7,753	2,771
North Carolina.....	739				196	543
Pennsylvania.....	36,469	31	490	490	27,859	7,599
Rhode Island.....	1,685				1,685	
Virginia.....	819				669	150

CHARACTER OF OWNERSHIP.

Table 16 presents statistics with respect to the character of ownership of the establishments in the silk manufacturing industry.

CHARACTER OF OWNERSHIP.	SILK MANUFACTURING INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	852	624	\$196,911,687	\$133,288,072
Individual.....	180	1143	19,081,800	11,048,417
Firm.....	1204	166	143,334,000	29,836,535
Corporations.....	468	315	134,495,867	92,403,120
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	21.1	122.9	9.7	8.3
Firm.....	123.9	26.6	122.0	22.4
Corporation.....	54.9	50.5	68.3	69.3

¹ Includes one establishment under an unclassified form of ownership, to avoid disclosure of individual operations.

In 1909, of the total number of silk mills reported, 54.9 per cent were under corporate ownership, as compared with 50.5 per cent in 1904, these establishments contributing more than two-thirds of the total value of products for the industry in both years (68.3 per cent and 69.3 per cent, respectively). Although establishments under individual and under firm ownership formed approximately the same percentage of the total number, the value of products of the establishments under the latter form of ownership was more than twice as great as that of establishments under individual ownership.

Table 17 gives statistics for establishments classified according to form of ownership for 8 leading states for 1909. The 1 establishment under an unclassified form of ownership has in this table been included with those under firm ownership.

STATE.	SILK MANUFACTURING INDUSTRY: 1909											
	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	180	204	468	9,746	21,904	67,387	\$18,081,800	\$43,334,000	\$134,495,867	\$9,533,210	\$18,853,107	\$58,768,434
Connecticut.....	8	10	29	633	623	7,447	1,030,757	1,109,736	18,922,194	583,018	612,329	8,132,995
Maryland.....			3		(X)	655		(X)	511,968		(X)	875,359
Massachusetts.....	6	3	9	(X)	(X)	4,109	(X)	(X)	3,942,246	(X)	(X)	3,512,395
New Jersey.....	86	99	163	3,695	8,880	17,710	8,395,443	18,385,422	38,648,685	4,158,341	8,927,330	19,078,702
New York.....	45	41	84	1,607	2,526	8,770	2,606,387	6,096,477	17,815,957	1,362,696	2,672,874	8,534,662
Pennsylvania.....	32	46	148	3,097	7,231	26,141	43,924,791	12,370,475	43,924,791	2,949,572	5,729,753	18,216,406
Rhode Island.....	1	2	10	(X)	(X)	1,685	(X)	(X)	4,684,451	(X)	(X)	1,396,746
Virginia.....			7			819			1,543,723			632,830

NOTE.—In some states in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for firms include those for one establishment under an unclassified form of ownership.

In 1909, 9,746 wage earners, or 9.8 per cent of the total, were employed in establishments under individual ownership; 21,904, or 22.1 per cent, in those under firm ownership, including the one establishment under an unclassified form of ownership; and 67,387, or 68 per cent, in those owned by corporations.

The different states show considerable variation in the relative importance of the establishments operated by individuals, firms, and corporations, respectively. In New Jersey, the leading state in the production of silk goods, establishments controlled by corporations constituted 46.8 per cent of the total number of establishments, gave employment to 58.5 per cent of the wage earners, and reported 59.1 per cent of the total value of products. In Pennsylvania, the second state in the industry, establishments under corporate ownership formed 65.5 per cent of the total number and reported 71.7 per cent of the wage earners and 70.8 per cent of the total value of products.

SIZE OF ESTABLISHMENTS.

Classification by value of products.—Table 18 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	SILK MANUFACTURING INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	852	624	\$196,911,687	\$133,288,072
Less than \$5,000.....	45	32	113,378	96,817
\$5,000 and less than \$20,000.....	130	101	1,511,784	1,190,256
\$20,000 and less than \$100,000.....	298	204	15,328,631	10,438,641
\$100,000 and less than \$1,000,000.....	342	264	111,378,638	81,783,414
\$1,000,000 and over.....	37	23	68,579,806	39,778,944
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	5.3	5.1	0.1	0.1
\$5,000 and less than \$20,000.....	15.3	16.2	0.8	0.9
\$20,000 and less than \$100,000.....	35.0	32.7	7.8	7.8
\$100,000 and less than \$1,000,000.....	40.1	42.3	56.6	61.4
\$1,000,000 and over.....	4.3	3.7	34.8	29.8

Establishments with products valued at \$100,000 but less than \$1,000,000 form the most important class, both numerically and as measured by value of products, such establishments constituting about two-fifths of the total number both in 1909 and 1904, and reporting 56.6 per cent of the total value of products in 1909 and 61.4 per cent in 1904. Establishments with products valued at \$1,000,000 or over formed only a small proportion of the total number at either census, but reported 34.8 per cent of the total value of products in 1909 and 29.8 per cent in 1904.

The average value of products per establishment increased from \$213,603 in 1904 to \$231,117 in 1909, and the average value added by manufacture, as computed from the figures in Table 5, from \$92,030 to \$104,630. The average number of wage earners per

establishment, on the other hand, shows a decrease from 128 in 1904 to 116 in 1909.

Classification by number of wage earners.—Table 19 classifies establishments in 9 of the leading states according to the number of wage earners employed.

STATE.	Total.		Establishments employing in 1909—																
			No wage earners.		1 to 5 wage earners.			6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States....	852	99,037	3	61	176	182	2,338	180	8,210	155	11,394	168	27,012	75	25,818	20	13,538	8	12,553
Connecticut.....	47	8,703	.....	.....	.....	10	142	11	387	8	566	11	1,718	4	1,396	2	1,595	1	2,899
Maryland.....	4	655	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts.....	19	4,109	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey.....	348	30,285	.....	29	73	102	1,290	74	2,540	63	4,586	54	8,590	19	6,880	4	2,592	3	3,754
New York.....	170	12,303	3	19	61	38	482	37	1,190	32	2,255	28	4,170	11	3,703	2	1,042	.....	.....
North Carolina.....	4	739	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania.....	226	36,469	.....	11	37	25	334	45	1,649	44	3,395	57	9,688	31	10,515	10	6,861	3	3,990
Rhode Island.....	13	1,685	.....	.....	.....	4	46	1	45	4	284	.....	.....	4	1,310	.....	.....	.....	.....
Virginia.....	7	819	.....	.....	.....	.....	.....	2	50	2	166	.....	.....	1	329	.....	.....	.....	.....

Of the 852 silk mills reported for 1909, 3 employed no wage earners; 28.5 per cent employed from 1 to 20 wage earners; 39.3 per cent from 21 to 100; 28.5 per cent from 101 to 500; 2.3 per cent from 501 to 1,000; and only nine-tenths of 1 per cent more than 1,000.

Of the total number of wage earners reported, 2.5 per cent were in establishments employing from 1 to 20 wage earners; 17.8 per cent in establishments employing from 21 to 100; 53.3 per cent in those employing from 101 to 500; 13.7 per cent in those employing from 501 to 1,000; and 12.7 per cent in establishments employing more than 1,000 wage earners. The most important class of establishments shown in the table is that comprising establishments employing from 101 to 250 wage earners, these establishments employing an aggregate of 27,012 wage earners, or 27.3 per cent of the total for the industry, while those employing from 251 to 500 wage earners were second, with 25,818 wage earners, or 26.1 per cent of the total.

EXPENSES.

As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$177,175,719, distributed as follows: Cost of materials, \$107,766,916, or 60.8 per cent; wages, \$38,570,085, or 21.8 per cent; salaries, \$7,527,279, or 4.2 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, taxes, traveling

expenses, and other sundry expenses, \$23,311,439, or 13.2 per cent.

The proportions of the total expenses represented by the different items naturally vary in the several states. The differences are very largely due to differences in the extent to which the organzine and tram used is made within the state or purchased from outside the state and in the relative importance of establishments engaged solely in throwing.

ENGINES, POWER, AND FUEL.

Engines and power.—The amount of power used in the silk manufacturing industry was first reported at the census of 1869. Table 5 shows that the total horsepower used increased from 1,911 in 1869 to 97,947 in 1909. Table 20 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the silk mills increased from 57,397 horsepower in 1899 to 97,947 horsepower in 1909, or 70.6 per cent. By far the greater part of the power used in the industry is steam power; the proportion which such power formed of the total primary power, however, decreased from 80.1 per cent in 1899 to 73.6 per cent in 1909, although there was a considerable absolute increase during the decade in the amount of steam power employed. Water power, also, which formed 11.6 per cent of the total primary power in 1899, shows a steady decrease in the proportion which it formed of the total, in spite of an increase in amount, constituting only 8.5 per cent of the total in 1909. The horsepower of electric motors operated by purchased current (rented electric power) increased from 609 in 1899 to 10,354 in 1909, and at the last census was second in importance to steam power, representing 10.6 per cent of the total

primary power, as compared with only 1 per cent a decade earlier.

The number and horsepower of electric motors used for distributing power by means of current generated in the establishment show a very large increase, the horsepower of such motors having more than trebled during the decade.

Table 21 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in nine of the leading states in the industry.

In 1909 Pennsylvania, New Jersey, and New York together reported 75,448 horsepower, or 77 per cent of the aggregate for the industry. Steam power was the most important form of power in all of the states shown separately except Massachusetts and Virginia, where water power was used to a greater extent than any other form of power. The largest amount of steam power, 37,410 horsepower, is shown for Pennsylvania; the largest amount of water power, 2,001 horsepower, for Massachusetts; and the largest amount of rented electric power, 2,960 horsepower, for Pennsylvania. The rented power included under the head of "Other," which is particularly large in New Jersey, is chiefly power supplied by shafts or belts to small mills.

Table 20

POWER.	SILK MANUFACTURING INDUSTRY.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	2,836	1,350	667	87,947	71,760	57,397	100.0	100.0	100.0
Owned.....	700	605	557	81,719	64,628	52,956	83.4	90.1	92.3
Steam.....	535	468	421	72,059	56,362	45,959	73.6	78.5	80.1
Gas.....	64	50	19	1,277	937	323	1.3	1.3	0.6
Water wheels.....	101	85	117	8,383	6,965	6,666	8.5	9.7	11.6
Water motors.....	.....	.....	.....	.....	9	.....	(1)	.....	.....
Other.....	.....	.....	.....	.....	355	8	.....	0.5	(1)
Rented.....	2,136	745	.....	16,228	7,132	4,441	16.6	9.9	7.7
Electric.....	2,136	745	.....	10,354	2,393	609	10.6	3.3	1.0
Other.....	.....	.....	.....	5,874	4,739	3,832	6.0	6.6	6.7
Electric motors.....	5,714	2,157	135	23,758	9,521	4,607	100.0	100.0	100.0
Run by current generated by establishment.....	3,578	1,412	135	13,404	7,128	3,998	56.4	74.9	86.8
Run by rented power.....	2,136	745	.....	10,354	2,393	609	43.6	25.1	13.2

¹ Less than one-tenth of 1 per cent.

Table 21

STATE.	SILK MANUFACTURING INDUSTRY.															
	Number of establishments reporting.	Total horsepower.	Primary horsepower.						Electric horsepower.		Fuel used.					
			Owned by establishments reporting.				Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States.....	844	97,947	81,719	72,059	1,277	8,383	10,354	5,874	23,758	13,404	242,771	155,256	3,601	993	3,072	49,673
Connecticut.....	47	8,564	8,050	6,577	.....	1,473	514	.....	2,286	1,772	2,268	39,794	.....	557	135	484
Maryland.....	4	915	850	850	.....	.....	65	.....	65	.....	.....	4,539	.....	.....	.....	.....
Massachusetts.....	19	5,305	4,012	1,991	20	2,001	1,281	12	1,823	542	13	12,632	.....	160	.....	60
New Jersey.....	346	22,376	15,799	14,378	303	1,118	2,381	4,196	5,731	3,350	74,090	16,817	3,601	8	273	5,640
New York.....	165	11,110	8,549	6,422	639	1,438	1,924	637	3,642	1,718	16,140	20,357	.....	6	114	36,591
North Carolina.....	4	865	865	865	.....	.....	.....	.....	320	320	402	3,441	.....	60	.....	.....
Pennsylvania.....	225	41,962	38,066	37,410	154	502	2,960	936	7,616	4,656	148,313	41,746	.....	43	637	5,508
Rhode Island.....	13	2,318	1,655	1,265	.....	390	630	33	779	149	134	4,156	.....	.....	.....	.....
Virginia.....	7	1,858	1,484	685	.....	799	374	.....	763	389	438	3,476	.....	.....	.....	.....
All other states.....	14	2,674	2,389	1,616	161	612	225	60	733	508	973	8,248	.....	159	1,913	1,390

Fuel consumed.—Anthracite coal was the principal class of fuel used, 242,771 long tons being consumed during 1909. Bituminous coal was next in impor-

tance, 155,256 short tons being consumed. Gas was also used to a considerable extent, the greatest quantity being reported for New York.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

MATERIALS.

Summary for the United States.—Table 22 shows statistics of the materials used in the industry for 1909, 1904, and 1899.

MATERIAL.	MATERIALS USED IN THE SILK MANUFACTURING INDUSTRY.			Per cent of increase: 1899-1909
	1909	1904	1899	
Total cost	\$107,766,916	\$75,861,188	\$62,406,665	72.7
Silk:				
Raw—				
Pounds.....	17,472,204	11,572,783	9,760,770	79.0
Cost.....	\$67,787,037	\$45,318,416	\$40,721,877	66.5
Spun—				
Pounds.....	2,112,972	1,951,201	1,550,291	36.3
Cost.....	\$4,848,789	\$4,310,061	\$3,406,059	42.4
Artificial—				
Pounds.....	914,494	466,151	6,056	15,000.6
Cost.....	\$1,926,894	\$1,623,473	\$10,380	18,463.5
Organzine and tram, purchased—				
Pounds.....	3,377,972	3,236,744	2,338,464	44.5
Cost.....	\$14,679,719	\$14,552,425	\$10,539,632	39.3
Fringe and floss, including waste, noils, etc., purchased—				
Pounds.....	2,402,960	1,49,811	1,735,179	38.5
Cost.....	\$1,637,187	\$187,159	\$1,008,947	62.3
Yarns, other than silk:				
Cotton (not including mercerized)—				
Pounds.....	12,617,292	8,387,048	6,444,208	95.8
Cost.....	\$4,687,173	\$2,586,954	\$1,830,550	156.1
Mercerized cotton—				
Pounds.....	1,494,586	631,247	219,861	579.8
Cost.....	\$1,124,409	\$471,035	\$165,683	578.6
Woolen or worsted—				
Pounds.....	610,588	443,155	239,461	155.0
Cost.....	\$765,989	\$409,867	\$167,770	356.6
Mohair—				
Pounds.....	710,108	138,389	104,810	577.5
Cost.....	\$640,529	\$137,097	\$107,365	496.6
All other—				
Pounds.....	353,780	130,430	108,388	226.4
Cost.....	\$456,597	\$108,841	\$134,986	238.3
Chemicals and dyestuffs.....	\$1,062,313	\$666,992	(¹)	.....
All other materials.....	\$8,150,280	\$5,488,868	\$4,313,416	89.0

¹ Does not include waste, noils, etc., which are included with "all other materials."
² Not reported separately.

The total cost of the materials used in the silk manufacturing industry in 1909 was \$107,766,916, as compared with \$75,861,188 in 1904 and \$62,406,665 in 1899, an increase during the decade of 72.7 per cent. The figures involve considerable duplication, as already stated, but it is not possible to make any accurate estimate of the extent of this duplication.

Attention is called to the fact that the statistics for raw silk shown in Table 22 do not represent the total amount of this material used in the industry. More than two-thirds of the raw silk used was thrown on contract, either for silk merchants or for weaving mills, and as this silk was not owned by the mills doing the throwing, its amount and value were not included by them in their report as to materials used. The silk thrown for the weaving mills, however, formed part of the materials reported by such mills and accordingly is included in the table, but that thrown for merchants, not being owned by silk manufacturing concerns, was not reported and so is not included in the statistics for the industry. It is impossible to give the amount of silk so thrown, but the quantity must have been considerable. Silk thrown for merchants and later sold by

them as organzine and tram to establishments within the silk industry does not figure in the statistics of materials as raw silk, but as organzine or tram only.

The reported cost of raw silk represented 62.9 per cent of the total cost of all materials used, while that of organzine and tram, purchased as such, represented 13.6 per cent, these two items forming more than three-fourths (76.5 per cent) of the total cost of materials. The following table shows the proportion which the quantity of the different materials used in the silk industry formed of the total in 1909, 1904, and 1899:

MATERIAL.	PER CENT OF TOTAL QUANTITY OF TEXTILE MATERIALS USED IN THE SILK MANUFACTURING INDUSTRY.		
	1909	1904	1899
Total	100.0	100.0	100.0
Silk	62.5	64.0	68.4
Raw silk.....	41.5	42.9	43.4
Spun silk.....	5.0	7.2	6.9
Artificial silk.....	2.2	1.7	(¹)
Organzine and tram.....	8.0	12.0	10.4
Fringe and floss, including waste, noils etc.....	5.7	² 0.2	7.7
Yarns, other than silk	37.5	36.0	31.6
Cotton.....	30.0	31.1	28.6
Mercerized cotton.....	3.6	2.3	1.0
Woolen or worsted.....	1.5	1.6	1.1
Mohair.....	1.7	0.5	0.4
All other.....	0.8	0.5	0.5

¹ Less than one-tenth of 1 per cent.

² Not including waste, noils, and pierced cocoons.

Silk in its various forms constituted about three-fifths of the total weight of textile materials used in 1909, and yarns other than silk about two-fifths. The quantity of raw silk used in the industry shows an increase of 79 per cent during the decade and its cost an increase of 66.5 per cent. The increase in the amount of yarns other than silk used was much greater than that in the silk used, thus indicating a tendency toward the manufacture of silk mixed goods. The amount of cotton yarn other than mercerized used in 1909 was nearly twice as great as in 1899, and that of mercerized cotton yarns, the consumption of which in 1899 was comparatively small, nearly seven times as great, while considerable increases are also shown for mohair and for woolen or worsted yarns.

The amount of spun silk purchased shows an increase of only 36.3 per cent for the decade, a smaller increase relatively than in any other material shown separately in Table 22. The quantity purchased exceeded the quantity reported as sold (see Table 27) by 1,333,510 pounds in 1909, 1,380,672 pounds in 1904, and 1,112,832 pounds in 1899. A large part of this material is imported, the total quantity brought into the country during the fiscal year ending June 30, 1909, being 2,343,576 pounds. Spun silk is used principally in the manufacture of silk-mixed goods, although large quantities are used in the cotton goods and woolen industries and in the manufacture of hosiery and knit goods. The spun silk manufactured in the United States is made, to a great extent, from the

waste which result from the various processes of manufacture carried on in the silk mills, together with imported wild silk and pierced cocoons.

Owing to the high price of silk and to its limited supply, great efforts have been made to secure satisfactory substitutes. As a result, a number of processes have been invented for making fibers closely resembling animal silk. The production of artificial silk is largely confined to Germany and France, but a number of other countries have mills devoted to its manufacture. Although the establishments in the United States have scarcely passed the experimental stage there is promise of a large output in this country. The silk mills of the United States used 914,494 pounds of artificial silk in 1909, as compared with 466,151 pounds in 1904, and 6,056 pounds in 1899. This material is used principally in the manufacture of braids and fringes, dress trimmings, millinery trimmings, etc.

In 1909 the silk mills purchased 3,377,972 pounds of organzine and tram. This amount is very little

larger than that for 1904, and only 44.5 per cent in excess of that reported for 1899. The quantity purchased exceeded that sold (see Table 28) by 637,653 pounds in 1909 and 1,211,099 pounds in 1904; in 1899, however, the quantity made for sale exceeded that purchased.

In addition to the silk materials already mentioned, 2,402,960 pounds of fringe and floss, waste, pierced cocoons, noils, and the like, valued at \$1,637,187, were purchased and used in the industry in 1909. No comparative data are available for 1904, but in 1899 the quantity of these materials used amounted to 1,735,179 pounds, valued at \$1,008,947, the increase in consumption for the decade amounting to 38.5 per cent. The imports of these materials for the fiscal year ending June 30, 1909, amounted to 1,854,207 pounds, valued at \$1,073,018 (see Table 27).

Materials, by states.—Table 24 shows, by states, the quantity and cost of the materials used in the silk mills in 1909, with quantities alone for 1904 and 1899.

Table 24	PRINCIPAL MATERIALS USED IN THE SILK MANUFACTURING INDUSTRY.				MATERIAL AND STATE.	PRINCIPAL MATERIALS USED IN THE SILK MANUFACTURING INDUSTRY.					
	MATERIAL AND STATE.	Cost: 1909	Quantity (pounds).			MATERIAL AND STATE.	Cost: 1909	Quantity (pounds).			
			1909	1904				1899	1909	1904	1899
	Raw silk	\$67,787,037	17,472,204	11,572,783	9,760,770	Cotton yarns (not including mercerized yarns)	4,687,173	12,617,292	8,387,048	6,444,208	
	Connecticut.....	6,099,209	1,624,701	1,320,509	1,159,961	Connecticut.....	850,437	2,410,085	1,359,021	1,187,863	
	Massachusetts.....	3,753,207	920,308	739,004	720,485	Massachusetts.....	535,889	1,225,386	724,594	480,220	
	New Jersey.....	23,705,609	6,112,647	3,553,080	3,155,334	New Jersey.....	781,061	1,889,158	1,054,973	757,488	
	New York.....	7,082,171	1,817,329	1,006,793	914,265	New York.....	757,470	2,018,612	1,197,943	1,556,545	
	Pennsylvania.....	21,206,972	5,532,973	3,970,044	3,238,285	Pennsylvania.....	1,077,157	2,869,000	2,591,135	1,759,759	
	Rhode Island.....	2,173,458	483,330	252,112	102,691	Rhode Island.....	404,141	1,421,229	969,426	409,936	
	All other states.....	3,756,411	980,916	721,231	469,749	All other states.....	281,018	783,812	489,956	292,399	
	Spun silk	4,848,789	2,112,972	1,951,201	1,550,291	Mercerized cotton yarns	1,124,409	1,494,586	631,247	219,861	
	Connecticut.....	1,425,657	596,379	716,607	502,558	Connecticut.....	20,270	29,310	21,560	1,642	
	New Jersey.....	628,027	244,617	154,201	178,735	Massachusetts.....	113,253	158,899	5,348	4,708	
	New York.....	759,710	315,622	249,896	263,200	New Jersey.....	390,198	490,307	261,905	122,053	
	Pennsylvania.....	1,566,914	695,067	454,074	477,543	New York.....	359,315	483,627	101,943	51,560	
	Rhode Island.....	175,113	73,816	52,145	51,516	Pennsylvania.....	224,029	309,063	227,944	30,070	
	All other states.....	293,368	187,471	324,278	76,739	Rhode Island.....	12,769	17,983	5,550	2,000	
	Artificial silk	1,928,894	914,494	466,151	6,058	All other states.....	4,575	5,897	6,997	7,828	
	New Jersey.....	197,208	103,148	8,066	.....	Woolen or worsted yarns	765,989	610,688	443,155	239,461
	New York.....	1,309,400	616,439	289,282	6,350	New Jersey.....	106,333	69,169	25,725	16,940	
	Pennsylvania.....	273,646	127,486	127,192	526	New York.....	114,829	94,622	184,340	45,527	
	All other states.....	146,640	67,421	41,611	180	Pennsylvania.....	98,340	83,075	48,870	8,717	
	Organzine and tram, purchased	14,679,719	3,377,972	3,238,744	2,338,464	All other states.....	446,487	363,722	184,220	168,277	
	Connecticut.....	238,785	54,619	28,844	31,041	Mohair yarns	640,529	710,108	138,389	104,810	
	New Jersey.....	4,899,843	1,143,754	1,343,081	1,209,012	Connecticut.....	488,984	542,061	97,323	1,236	
	New York.....	1,471,824	335,003	603,623	197,781	New Jersey.....	79,829	96,496	11,253	.....
	Pennsylvania.....	7,531,045	1,719,952	1,202,805	871,235	New York.....	47,408	52,521	14,511	29,697	
	All other states.....	538,222	124,644	58,391	29,395	All other states.....	24,308	19,030	15,302	73,877	
	Fringe and floss, including waste, noils, etc., purchased	1,637,187	2,402,960	149,811	1,735,179	Other yarns	456,597	353,780	130,930	108,388	
	New York.....	326,691	615,545	7,080	308,486	New York.....	170,491	113,855	71,486	24,167	
	Pennsylvania.....	93,764	55,863	32,960	221,151	Pennsylvania.....	148,013	178,306	49,824	31,323	
	All other states.....	1,216,732	1,831,552	9,771	1,205,542	All other states.....	138,093	61,619	9,620	52,808	

1 Not including waste, noils, etc.

Consumption of silk in other textile industries.—In addition to the silk used in the silk manufacturing industry, considerable amounts were used in other textile industries in the manufacture of goods of mixed fibers and of silk hosiery and silk knit goods, and also in the electrical industry for covering wire, for which data in regard to consumption is not available. Table 25 shows the quantity of reeled and spun silk yarns used in the United States in textile industries other than the silk manufacturing industry for 1909, 1904, and 1899.

The quantity of silk used in other textile industries in 1909 was more than three times as large as in 1899.

The amounts used in hosiery and knit goods and cotton manufactures each show an increase of about 270 per cent; the quantity used in wool manufactures, however, shows an increase of less than 50 per cent. In cotton manufactures silk is used exclusively in the manufacture of fancy woven fabrics with silk stripes or figures. The statistics for 1909 show the remarkable increase in the production of silk hosiery from 12,572 dozen pairs in 1899 and 42,065 dozen pairs in 1904 to 434,414 dozen pairs in 1909, and this accounts for most of the increase shown for the hosiery and knit goods industry.

Table 25

INDUSTRY.	SILK YARN USED.		
	1909	1904	1899
Total.....pounds..	3,524,136	1,221,953	1,147,270
Cotton manufactures.....pounds..	2,062,006	412,589	560,680
Wool manufactures.....pounds..	479,376	488,326	320,343
Hosiery and knit goods.....pounds..	982,753	1 321,038	266,247
Per cent of total.....	100.0	100.0	100.0
Cotton manufactures.....	58.5	33.8	48.9
Wool manufactures.....	13.6	40.0	27.9
Hosiery and knit goods.....	27.9	26.3	23.2

¹ Includes 367 pounds reported by the cordage and twine and jute and linen goods industry.

Raw silk thrown under contract.—Formerly the throwing of raw silk in the United States was carried on chiefly in establishments which used the organzine and tram in further processes of manufacture. The practice on the part of weaving mills of having the silk thrown under contract in establishments whose activities are limited to this work, has, however, been growing rapidly. Table 26 shows, by states, the quantity of raw silk thrown under contract into organzine and tram in 1909, 1904, and 1899.

Table 26

STATE.	RAW SILK (POUNDS).			
	Total amount used in the industry.	Thrown under contract.		
		Total.	Into organzine.	Into tram.
United States:				
1909.....	17,472,204	12,753,002	6,114,209	6,638,793
1904.....	11,672,783	7,101,851	3,635,384	3,466,467
1899.....	9,760,770	4,298,659	2,331,456	1,967,203
Connecticut:				
1909.....	1,624,701	290,253	150,332	139,921
1904.....	1,320,509	216,454	131,038	85,416
1899.....	1,159,961	253,858	184,270	69,588
Massachusetts:				
1909.....	920,308	116,543	56,670	59,873
1904.....	739,004			
1899.....	720,485	8,000		8,000
New Jersey:				
1909.....	6,112,647	2,661,205	813,906	1,847,299
1904.....	3,553,090	1,689,088	702,055	987,033
1899.....	3,155,334	1,237,622	585,722	651,900
New York:				
1909.....	1,817,329	936,754	495,053	441,701
1904.....	1,006,793	705,078	359,248	345,830
1899.....	914,265	322,381	117,981	204,400
North Carolina:				
1909.....	125,769	321,366	66,024	255,342
1904.....				
1899.....	20,200	73,000		73,000
Pennsylvania:				
1909.....	5,532,973	7,733,016	4,150,688	3,582,328
1904.....	3,970,044	4,116,299	2,283,174	1,828,125
1899.....	3,238,285	2,259,673	1,332,768	926,915
Rhode Island:				
1909.....	483,330			
1904.....	262,112	88,000	68,000	20,000
1899.....	102,691	16,599	16,599	
Virginia:				
1909.....	214,434	164,114	120,852	43,262
1904.....				
1899.....	164,200	94,930	67,220	27,710
All other states:²				
1909.....	640,713	529,751	260,684	269,067
1904.....	721,231	286,932	86,899	200,063
1899.....	285,349	32,596	26,906	5,690

¹ Included in "all other states."

² All other states embrace: In 1909, California, Delaware, Georgia, Illinois, Maine, Maryland, Michigan, New Hampshire, and Ohio; in 1904, California, Delaware, Illinois, Maine, Maryland, Michigan, New Hampshire, North Carolina, Ohio, and Virginia; and in 1899, California, Delaware, Illinois, Maine, Maryland, Michigan, New Hampshire, and Utah.

The total amount of raw silk thrown under contract in 1909 was 12,753,002 pounds, equal to 73 per cent of the total amount used in the industry, the corresponding ratio for 1904 being 61.4 per cent, and that for 1899, 44 per cent. While these percentages do not show the proportion of the total amount of raw

silk used in the industry which was thrown under contract in the respective years, owing to the fact that the silk reported as thrown under contract includes that thrown for merchants and others not in the silk manufacturing industry, they are sufficiently close to give a general idea of the relative extent of commission throwing and of the increase in the relative importance of such throwing during the decade covered by the table.

The quantity of silk thrown under contract almost trebled during the decade 1899-1909. Pennsylvania led in this branch of the industry in 1909, reporting 7,733,016 pounds, or about three-fifths (60.6 per cent) of the total amount of silk so thrown.

Imports.—Silk mills depend upon imports for their raw silk material. Table 27 shows the quantity and value of the imports of raw silk, spun silk, and raw silk waste for each fiscal year from 1899 to 1909, inclusive.

Table 27

YEAR ENDING JUNE 30—	IMPORTED SILK MATERIALS. ¹			
	Total.	Raw silk.	Spun silk.	Raw silk waste, including cocoons and noils.
QUANTITY (POUNDS).				
1909.....	27,531,533	23,333,750	2,343,576	1,854,207
1908.....	18,802,980	15,424,041	2,140,848	1,238,091
1907.....	21,223,268	16,722,207	2,479,364	2,021,697
1906.....	19,609,281	14,505,324	2,257,260	2,846,697
1905.....	24,709,713	17,812,133	2,352,406	4,545,174
1904.....	18,775,983	12,630,883	2,053,274	4,091,826
1903.....	17,265,871	13,637,206	1,995,012	1,633,653
1902.....	16,396,071	12,620,682	2,161,245	1,614,144
1901.....	12,120,622	9,139,617	1,715,067	1,285,938
1900.....	15,494,270	11,259,310	2,420,552	1,814,408
1899.....	12,978,093	9,691,145	1,727,710	1,569,238
VALUE.				
1909.....	\$83,487,443	\$78,830,568	\$3,583,857	\$1,073,018
1908.....	68,249,135	63,665,534	3,702,232	881,369
1907.....	75,187,643	70,229,518	3,775,744	1,182,381
1906.....	57,308,424	52,855,611	3,227,920	1,224,893
1905.....	64,327,695	59,542,892	3,287,642	1,497,161
1904.....	49,148,317	44,461,564	3,047,817	1,638,936
1903.....	53,005,701	49,002,597	2,994,651	1,008,453
1902.....	45,941,875	41,714,331	3,306,524	921,020
1901.....	32,635,081	29,353,777	2,583,716	697,588
1900.....	49,053,108	44,549,672	3,723,348	780,088
1899.....	34,454,643	31,827,061	1,975,016	652,566

¹ Bureau of Foreign and Domestic Commerce, Department of Commerce, "Commerce and Navigation of the United States."

PRODUCTS.

Summary for the United States.—Table 28 shows in detail for 1909, 1904, and 1899, the quantity and value of the products of the establishments within the silk manufacturing industry.

The single-width yard is used as the unit of measurement in Table 28 and all other tables giving statistics of products for the industry.

The total value of products for the industry increased \$89,655,409, or 83.6 per cent, between 1899 and 1909. The total production of silk goods of broad weave (broad silks, velvets, plushes, tapestries, and upholstery) in 1909 was 198,787,027 running yards, valued at \$115,136,724, as compared with 97,940,935 yards, valued at \$58,122,622, in 1899, the increase in output being 103 per cent, and that in value, 98.1 per cent.

Table 28

PRODUCT.	PRODUCTS OF THE SILK MANUFACTURING INDUSTRY.			
	1909	1904	1899	Per cent of increase: 1899-1909
Total value	\$196,911,667	\$133,288,072	\$107,256,258	83.6
Broad silks:				
Yards.....	185,707,316	124,871,215	87,636,883	111.9
Value.....	\$107,881,146	\$66,917,762	\$52,152,816	106.9
Plain and fancies--				
All-silk--				
Yards.....	81,934,158	68,393,042	53,673,488	62.9
Value.....	\$58,282,704	\$40,741,480	\$33,852,111	57.4
Silk-mixed--				
Yards.....	24,742,556	9,061,025	8,963,315	176.0
Value.....	\$14,207,861	\$5,343,472	\$5,450,710	160.7
Jacquard--				
All-silk--				
Yards.....	13,249,090	8,143,091	7,532,229	75.9
Value.....	\$9,835,345	\$5,927,063	\$5,379,001	82.8
Silk-mixed--				
Yards.....	6,043,686	2,336,120	1,677,466	260.3
Value.....	\$3,473,799	\$1,229,648	\$1,260,321	175.6
Piece-dyed--				
All-silk--				
Yards.....	19,693,393	21,334,584	7,331,501	168.6
Value.....	\$11,353,242	\$9,276,445	\$3,342,167	239.7
Silk mixed--				
Yards.....	40,044,433	15,603,353	8,558,884	367.9
Value.....	\$15,728,195	\$4,399,654	\$2,868,506	448.3
Velvets:				
Yards.....	10,093,583	7,262,315	5,122,249	97.1
Value.....	\$4,767,990	\$3,161,206	\$2,479,903	92.3
Plushes:				
Yards.....	2,759,411	2,547,367	3,848,684	-28.3
Value.....	\$2,104,768	\$1,340,815	\$2,480,068	-15.1
Tapestries and upholstery:				
Yards.....	226,717	1,766,210	1,333,119	-83.0
Value.....	\$382,820	\$1,559,982	\$1,009,835	-62.1
Ribbons.....	\$32,744,873	\$21,890,604	\$18,467,179	77.3
Laces, nets, veils, veiling, etc.....	\$1,350,850	\$745,489	\$803,104	68.2
Embroideries.....	\$485,322	\$112,362	\$57,625	742.2
Fringes and gimps.....	\$824,527	\$1,016,954	\$444,787	85.4
Braids and bindings.....	\$4,483,248	\$3,493,977	\$1,522,565	194.5
Trimmings.....	\$3,850,448	\$3,107,697	\$2,034,076	89.3
Milliners'.....	\$1,646,136	\$1,333,735	\$615,012	167.7
Ladies' dress.....	\$1,580,547	\$1,549,391	\$912,361	73.2
Military.....	\$346,963	\$170,231	\$54,666	534.7
Cloak.....	\$235,762	\$53,640	\$241,560	-2.4
Tailors'.....	\$41,040	\$700	\$26,624	54.1
Other.....			\$183,853	
Machine twist:				
Pounds.....	1,088,780	932,998	987,917	10.2
Value.....	\$6,341,719	\$5,521,055	\$5,997,974	5.7
Sewing, embroidery, wash, fringe, and floss silks:				
Pounds.....	747,246	811,711	739,301	1.1
Value.....	\$4,179,355	\$4,625,016	\$4,248,216	-1.6
Organzine and tram, for sale:				
Pounds.....	2,740,319	2,025,645	2,468,387	11.0
Value.....	\$12,550,510	\$9,190,650	\$11,167,191	12.4
Spun silk, for sale:				
Pounds.....	779,462	570,529	437,459	78.2
Value.....	\$2,104,066	\$1,660,647	\$1,026,227	105.0
All other products.....	\$4,495,675	\$5,227,800	\$1,027,472	337.5
Amount received for contract work.....	\$8,364,350	\$3,716,056	\$2,337,220	257.9

¹ A minus sign (-) denotes decrease.

² In addition, similar classes of silk goods to the value of \$1,218,101 were made by establishments engaged primarily in the manufacture of other products, and silk hosiery and knit goods to the value of \$4,543,708 were reported by hosiery and knit goods establishments.

Broad silks formed over nine-tenths of all broad weaves in 1909, the increase in the output between 1899 and 1909 being 111.9 per cent. All-silk goods constituted 61.9 per cent of the broad silk product in 1909 as compared with 78.1 per cent in 1899, the production of such goods increasing only 67.9 per cent during the decade, as compared with an increase of 268.9 per cent in the case of silk-mixed broad silks. In the case of each of the three main classes of broad silks, the increase in the output and value of silk-mixed goods was much greater relatively than that in the output and value of all-silk goods. Plain and fancy silks were the most important class of broad silks, representing 57.4 per cent of the total production in 1909 and contributing 62.6 per cent of the total value; of the total output of these fabrics, all-silk

goods represented 76.8 per cent. Piece-dyed broad silks ranked next in importance, representing 32.2 per cent of the total output of broad silks and contributing 25.1 per cent of the total value; about two-thirds (67 per cent) of the total production of piece-dyed goods consisted of silk-mixed fabrics. The output of Jacquard broad silks, of which somewhat more than two-thirds (68.7 per cent) consisted of all-silk goods, was much less than that of the other two classes, representing 10.4 per cent of the total production of broad silks and contributing 12.3 per cent of the total value.

Each class of broad silk shows a considerable increase for the decade as a whole, the largest relative increase being in the case of silk-mixed piece-dyed broad silks, the output of which in 1909 was nearly five times as great as in 1899. The production of all-silk piece-dyed broad silks decreased 7.7 per cent between 1904 and 1909, although it was more than twice as great in the later year as in 1899.

The production of velvets nearly doubled during the decade, but there was a marked decrease in that of plushes, although there was a slight increase between 1904 and 1909. The production of tapestries and upholstery also decreased, all of the decrease taking place during the latter part of the decade.

Silk goods of narrow weave are of such varied widths that statistics of output in yards would have little meaning. Most of these goods show large increases in value, however, the increase for the decade in the value of embroideries and in that of braids and bindings being particularly noteworthy.

The figures for organzine and tram sold, of course fall short of representing the total production of organzine and tram other than for the use of the establishment doing the throwing, owing to the fact that they do not include the large amount of organzine and tram thrown under contract for establishments furnishing the raw silk. As shown by Table 26, a total of 12,753,002 pounds of raw silk were thrown under contract in 1909, none of the organzine and tram obtained from this silk being included as such in Table 28.

The production of sewing, embroidery, wash, fringe, and floss silks shows a decrease of 7.9 per cent for the five-year period 1904-1909, and its value a decrease of 9.6 per cent, although the production in 1909 represented an increase of 1.1 per cent over that in 1899.

"All other products," for which the value was separately reported in 1909, amounted to \$4,495,675 and include a variety of commodities, some of which may have been included at previous censuses among those for which separate quantities and values were shown, and but inadequately represents the importance of the manufactures included under this heading. Silk hosiery and knit goods were not separately called for in the schedule used in 1899, 1904, and 1909. Hence, no figures as to this production are available. The various items comprising this total

for 1909, in so far as they can be segregated, were as follows:

ARTICLES.	Value.
Total	\$4,495,675
Casket and upholstery trimmings, cords, tassels, etc.....	890,148
Gloves.....	279,860
Mufflers and handkerchiefs.....	267,910
Ties, neckwear, and belting.....	152,240
Fabrics.....	110,732
Fish lines.....	86,665
Dyed silk (raw silk).....	1,186,462
Miscellaneous unclassified silk products, and waste.....	673,230
Miscellaneous products, other than silk.....	808,428

In addition to the products covered by Table 28, silk goods were manufactured to some extent by establishments assigned to industries other than the silk manufacturing industry proper, and Table 29 shows for 1909 their quantity and value so far as separately reported, manufactured in all industries combined, in the industry designated "silk and silk goods, including throwsters," and in all other industries, respectively.

Table 29 PRODUCT.	Total production: 1909	Production in the silk manufactur- ing industry.	Production in other industries. ¹
Value of all products.....	\$202,678,476	\$166,911,667	\$5,766,808
Broad silks, plain and fancies—			
All silk—			
Yards.....	82,307,526	81,034,188	373,368
Value.....	\$53,419,522	\$53,282,704	\$136,818
Silk mixed—			
Yards.....	28,645,106	24,742,556	3,902,550
Value.....	\$15,136,632	\$14,207,881	\$928,771
Plushes:			
Yards.....	2,770,311	2,759,411	10,900
Value.....	\$2,112,968	\$2,104,768	\$8,200
Ribbons.....	\$32,873,469	\$32,744,873	\$128,596
Braids and bindings.....	\$4,495,964	\$4,483,248	\$12,716
Trimmings.....	\$3,853,448	\$3,850,448	\$3,000
Hosiery.....	\$3,600,418	(8)	\$3,600,418
Shirts and drawers, silk and silk mixed..	\$709,074	(8)	\$709,074
Combination suits, silk and silk mixed..	\$239,218	(8)	\$239,218
All other products.....	\$86,237,765	\$86,237,765	

¹ Includes products made by establishments in the following industries: Clothing, men's, including shirts; corsets; cotton goods and cotton small wares; fancy articles not elsewhere specified; furnishing goods, men's; hosiery and knit goods.

² Exclusive of hosiery and knit goods made in the silk manufacturing industry.

³ Included with "all other products."

The total value of products reported for the silk manufacturing industry proper in 1909 includes

\$16,242,087, representing the value of organzine and tram, spun silk, and other partly finished products, a large part of which were sold to other manufacturing establishments for use as material in the manufacture of silk goods, and \$808,428 representing the value of products other than silk manufactures, so far as these were separately returned. The subtraction of the two figures just given from the total value of products for the industry leaves a remainder of \$179,861,152, which represents approximately the value of the finished silk goods made in the industry, although it may include the value of some products other than silk goods which were not specifically reported. On the other hand, silk and silk mixed hosiery and knit goods to the value of \$4,548,708 were reported by establishments in the hosiery and knit goods industry, and other silk manufactures to the value of \$1,218,101 were reported by establishments engaged primarily in the manufacture of other products, although it is probable that these figures do not represent the total production of silk manufactures outside the silk manufacturing industry, as some establishments making these products may not have reported them separately. Combining the two figures just given with that previously given as representing the approximate value of finished silk goods made by establishments in the silk manufacturing industry proper, a total of \$185,627,961 is obtained, which represents approximately the total value of the finished silk goods manufactured in 1909.

Products, by states.—Table 30 gives, by states, the quantities of the different products of the silk manufacturing industry, so far as reported, for 1909, 1904, and 1899, with the values for 1909; and the value only for 1909, 1904, and 1899 of all products for which the quantity was not reported.

Table 31 gives for 1909 and 1899 the per cent distribution, by states, of the output (or the value) of all products for which the quantity or value is shown separately in Table 30.

Table 30

PRODUCTS OF THE SILK MANUFACTURING INDUSTRY.

PRODUCT AND STATE.	1909		1904	1899
	Value.	Yards.	Yards.	Yards.
Broad silks	\$107,831,146	185,707,315	124,871,215	87,638,883
Connecticut	5,890,233	11,454,011	7,562,166	5,470,874
Massachusetts	5,898,231	9,688,788	4,235,637	2,706,638
New Jersey	43,167,205	64,788,199	46,700,737	40,594,148
New York	9,042,488	15,217,298	10,896,809	7,545,865
Pennsylvania	35,772,192	65,569,386	43,652,924	26,863,629
Rhode Island	4,415,041	11,649,145	6,497,937	2,367,437
All other states	3,695,156	7,360,488	5,425,005	2,099,592
All-silk	74,471,291	114,876,640	87,870,717	68,437,218
Connecticut	4,146,923	7,724,079	6,312,651	4,814,129
New Jersey	35,653,705	52,403,047	42,327,218	36,415,300
New York	5,946,921	8,707,603	10,002,610	3,989,439
Pennsylvania	25,873,332	41,600,686	33,624,116	20,565,734
All other states	2,950,410	4,441,225	5,104,222	2,652,616
Silk-mixed	33,409,855	70,830,675	27,000,498	19,199,665
Connecticut	1,743,310	3,729,932	749,615	656,745
New Jersey	7,613,500	12,385,152	4,373,519	4,178,848
New York	3,085,557	6,509,695	894,199	3,556,126
Pennsylvania	9,898,860	23,968,700	9,928,808	6,287,895
All other states	11,058,618	24,237,196	11,054,357	4,520,051
Plain and fancies:				
All-silk	53,282,704	81,934,167	88,393,042	53,573,488
Massachusetts	1,237,522	1,687,102	1,049,292	665,153
New Jersey	24,000,880	36,759,094	32,971,793	28,268,970
New York	4,421,795	5,923,694	4,672,699	3,859,029
Pennsylvania	22,291,788	35,923,451	25,404,097	17,837,478
All other states	1,330,719	1,640,816	4,295,161	2,892,858
Silk-mixed	14,207,861	24,742,558	9,061,026	8,963,315
New Jersey	3,808,772	6,077,863	1,822,091	2,331,493
New York	1,132,667	1,974,661	681,761	1,047,130
Pennsylvania	4,076,011	7,466,518	1,061,199	669,377
All other states	5,190,411	9,223,514	6,495,974	4,915,315
Jacquard:				
All-silk	9,835,345	13,249,090	8,143,091	7,532,229
New Jersey	8,352,659	10,880,081	5,480,654	6,451,655
New York	377,875	417,740	1,057,489	108,410
Pennsylvania	660,880	1,101,107	894,916	903,001
All other states	443,931	850,162	710,032	69,163
Silk-mixed	3,473,789	6,043,686	2,336,120	1,677,486
New Jersey	1,970,175	2,722,960	1,220,195	1,466,355
New York	16,591	16,950	209,191	61,426
Pennsylvania	462,643	918,258	406,052	56,421
All other states	1,024,390	2,385,518	500,682	93,264
Piece-dyed:				
All-silk	11,353,242	19,693,393	21,334,684	7,331,601
New Jersey	3,200,166	4,763,872	3,874,771	1,694,675
New York	1,147,251	2,366,169	4,272,422	22,000
Pennsylvania	2,920,664	4,576,128	7,325,103	1,775,255
All other states	4,085,161	7,987,224	5,862,288	3,839,571
Silk-mixed	15,728,195	40,044,433	15,603,353	8,558,884
Connecticut	1,409,717	3,319,973	582,580	147,833
Massachusetts	1,288,348	2,505,211	50,000	20,384
New Jersey	1,834,553	3,584,329	1,331,233	381,000
New York	1,946,309	4,518,084	3,247	2,447,570
Pennsylvania	5,360,206	15,583,924	8,461,557	5,562,097
All other states	3,889,062	10,532,912	5,174,736	
Velvets	4,767,990	10,093,683	7,262,315	5,122,249
Connecticut	4,519,238	9,741,329	7,154,387	4,261,208
All other states	248,752	352,254	107,928	861,041
Plushes	2,104,788	2,759,411	2,547,367	3,848,684
Connecticut	1,439,937	2,171,429	1,894,107	1,011,457
All other states	664,831	587,982	653,260	2,837,227
Upholstery	197,474	105,622	572,884	1,011,141
Tapestries	185,346	121,095	1,183,328	321,978

PRODUCTS OF THE SILK MANUFACTURING INDUSTRY.

PRODUCT AND STATE.	1909		1904	1899
	Value.	Pounds.	Pounds.	Pounds.
Machine twist	\$6,341,719	1,088,780	932,998	887,917
Massachusetts	636,524	109,312	134,256	269,241
New York	606,978	164,665	35,325	46,500
Pennsylvania	609,523	117,766	28,223	43,475
All other states	4,489,694	707,037	735,194	628,700
Sewing, embroidery, and wash silks	3,778,306	680,507	808,267	477,858
Massachusetts	1,302,794	220,562	262,076	170,423
New York	253,875	69,931	12,960	18,528
All other states	2,221,637	370,024	331,321	288,707
Fringe and floss silks	401,049	88,739	205,354	261,643
Massachusetts	168,001	26,396	6,610	20,964
Pennsylvania	213,320	66,402	106,073	128,262
All other states	19,728	3,941	92,671	112,417
Organzine and tram, for sale	12,550,510	2,740,319	2,026,845	2,468,387
New Jersey	1,240,406	286,456	171,167	316,646
New York	1,354,540	330,026	99,866	48,283
Pennsylvania	7,475,327	1,642,004	1,396,424	1,723,791
All other states	2,480,237	501,831	358,168	380,687
Spun silk, for sale	2,104,066	779,462	570,529	437,459
Connecticut	923,321	339,400	328,866	166,265
All other states	1,180,745	440,062	241,663	271,194
Ribbons	32,744,873		Value.	Value.
Connecticut	1,125,697		\$21,880,604	\$18,467,179
New Jersey	14,971,005		1,153,963	655,807
New York	6,261,289		10,036,331	8,341,721
Pennsylvania	10,008,146		4,983,712	4,883,011
All other states	378,736		5,573,799	4,368,399
Laces, nets, veils, veils, etc.	1,350,850		745,489	803,104
New Jersey	631,923		414,691	423,257
New York	794,640		291,400	377,047
All other states	24,287		39,198	2,800
Fringes and gimps	824,627		1,016,964	444,787
New York	560,027		544,544	196,528
Pennsylvania	171,423		349,570	170,695
All other states	93,077		122,840	78,564
Braids and bindings	4,483,248		3,493,977	1,522,565
New Jersey	766,563		404,456	162,595
New York	2,566,881		2,042,365	388,391
Pennsylvania	539,732		424,277	119,573
All other states	620,072		622,879	652,006
Trimmings	3,850,448		3,107,697	2,034,076
New Jersey	244,408		160	160
New York	1,998,688		1,725,985	767,294
Pennsylvania	1,498,148		1,328,307	1,010,145
All other states	209,204		55,405	256,477
All other products	4,496,876		5,227,800	1,027,472
Connecticut	702,031		74,470	192,744
Massachusetts	25,746		383,821	21,063
New Jersey	1,323,369		855,408	434,501
New York	1,489,120		2,539,445	133,622
Pennsylvania	938,031		1,092,372	171,349
Rhode Island	17,475		54,283	8,400
All other states	1,903		228,001	65,803
Amount received for contract work	8,364,350		3,716,058	2,337,220
Connecticut	293,332		230,614	136,362
Massachusetts	107,056		26,342	9,278
New Jersey	2,436,573		998,890	766,844
New York	606,010		268,252	238,218
Pennsylvania	4,416,978		1,994,319	1,070,133
Rhode Island	3,394		61,800	14,294
All other states	501,007		135,839	102,091

Table 31

PRODUCT AND STATE.	PER CENT DISTRIBUTION OF PRODUCTS OF THE SILK MANUFACTURING INDUSTRY.		PRODUCT AND STATE.	PER CENT DISTRIBUTION OF PRODUCTS OF THE SILK MANUFACTURING INDUSTRY.	
	1909	1899		1909	1899
Broad silks	<i>Quantity.</i>	<i>Quantity.</i>		<i>Quantity.</i>	<i>Quantity.</i>
Pennsylvania.....	100.0	100.0	Velvets	100.0	100.0
New Jersey.....	35.3	30.6	Connecticut.....	96.5	83.2
New York.....	34.9	46.3	All other states.....	3.5	16.8
Rhode Island.....	8.2	8.6	Plushes	100.0	100.0
Connecticut.....	6.3	2.7	Connecticut.....	78.7	28.3
Massachusetts.....	6.2	6.2	All other states.....	21.3	73.7
All other states.....	5.2	3.1	Machine twist	100.0	100.0
	4.0	2.4	New York.....	14.2	4.7
All-silk	100.0	100.0	Pennsylvania.....	10.8	4.4
New Jersey.....	45.6	53.2	Massachusetts.....	10.0	27.3
Pennsylvania.....	36.2	30.1	All other states.....	64.9	63.6
New York.....	7.6	5.8	Sewing, embroidery, and wash silks	100.0	100.0
Connecticut.....	6.7	7.0	Massachusetts.....	33.4	35.7
All other states.....	3.9	3.9	New York.....	10.6	3.9
Silk-mixed	100.0	100.0	All other states.....	56.0	60.4
Pennsylvania.....	33.8	32.8	Fringe and floss silks	100.0	100.0
New Jersey.....	17.5	21.8	Pennsylvania.....	65.0	49.0
New York.....	9.2	18.5	Massachusetts.....	30.4	8.0
Connecticut.....	5.3	3.4	All other states.....	4.5	43.0
All other states.....	34.2	23.5	Organzins and tram, for sale	100.0	100.0
Plain and fancies:			Pennsylvania.....	59.9	69.8
All-silk	100.0	100.0	New York.....	12.0	2.0
New Jersey.....	44.9	52.8	New Jersey.....	9.7	12.8
Pennsylvania.....	43.8	33.4	All other states.....	18.3	15.4
New York.....	7.2	7.2	Spun silk, for sale	100.0	100.0
Massachusetts.....	2.1	1.2	Connecticut.....	43.5	38.0
All other states.....	2.0	5.4	All other states.....	56.5	62.0
Silk-mixed	100.0	100.0	Ribbons	<i>Value.</i>	<i>Value.</i>
Pennsylvania.....	30.2	7.5	New Jersey.....	100.0	100.0
New Jersey.....	24.6	26.0	Pennsylvania.....	45.7	45.2
New York.....	8.0	11.7	New York.....	30.6	23.7
All other states.....	37.3	54.8	Connecticut.....	19.1	26.4
Jacquard:			All other states.....	3.4	3.6
All-silk	100.0	100.0	All other states.....	1.2	1.2
New Jersey.....	82.1	85.7	Laces, nets, veils, vallings, etc.	100.0	100.0
Pennsylvania.....	8.3	12.0	New York.....	58.8	46.9
New York.....	3.2	1.4	New Jersey.....	39.4	52.7
All other states.....	6.4	0.9	All other states.....	1.8	0.3
Silk-mixed	100.0	100.0	Fringes and gimps	100.0	100.0
New Jersey.....	45.1	87.4	New York.....	67.9	44.0
Pennsylvania.....	15.1	3.4	Pennsylvania.....	20.8	38.4
New York.....	0.3	3.7	All other states.....	11.3	17.7
All other states.....	39.5	5.6	Braids and bindings	100.0	100.0
Piece-dyed:			New York.....	57.3	25.5
All-silk	100.0	100.0	New Jersey.....	16.9	10.7
New Jersey.....	24.2	23.1	Pennsylvania.....	12.0	7.9
Pennsylvania.....	23.2	24.2	All other states.....	13.8	56.0
New York.....	12.0	0.3	Trimmings	100.0	100.0
All other states.....	40.6	52.4	New York.....	49.3	37.7
Silk-mixed	100.0	100.0	Pennsylvania.....	38.9	49.7
Pennsylvania.....	38.9	65.0	New Jersey.....	6.3	.....
Massachusetts.....	26.3	0.2	All other states.....	5.4	12.6
New York.....	11.3	28.6			
New Jersey.....	9.0	4.5			
Connecticut.....	8.3	1.7			
All other states.....	6.2	.....		

New Jersey was the leading state in the production of all-silk broad silks, reporting 45.6 per cent of the total. Pennsylvania was second, with 36.2 per cent. Pennsylvania and New Jersey together reported over one-half of the production of silk-mixed broad silks, Pennsylvania alone reporting 33.8 per cent. The increase in output in this state during the decade amounted to 281.2 per cent. New Jersey and Pennsylvania also led in the output of plain and fancy silks, reporting for 1909, 44.9 per cent and 43.8 per cent respectively, of the all-silk fabrics, and 24.6 per cent and 30.2 per cent, respectively, of the silk-mixed goods. The production of all-silk Jacquards reported for New Jersey represented 82.1 per cent of the total for the United States, while New Jersey also reported 45.1 per cent of the total output of silk-mixed Jacquards. New Jersey and Pennsylvania together reported nearly one-half of the total production of all-silk piece-dyed broad silks, the output of the former state being slightly larger than that of the

latter; Pennsylvania, however, led in the production of silk-mixed goods, with 38.9 per cent of the total, New Jersey reporting only 9 per cent. Pennsylvania reported about three-fifths of the organzine and tram sold as such, much of this being sold to establishments in other states.

More than three-fourths of the total value of ribbons for the United States was reported from New Jersey and Pennsylvania. The production of laces, nets, veils, etc., was practically confined to two states, New York reporting 58.8 per cent of the total value and New Jersey 39.4 per cent. New York also reported about two-thirds of the total value of fringes and gimps, nearly three-fifths of the value of braids and bindings, and about one-half of the value of trimmings. Connecticut reported almost the entire output of velvet produced, and nearly four-fifths of the plushes, and also led in the production of machine twist, and of sewing, embroidery, and wash silks, as well as in that of spun-silk yarn.

Contract work.—Table 32 shows by states the distribution of the establishments in the silk manufacturing industry reporting contract work. Of the 852 establishments in the industry in 1909, 139 reported that they finished or printed their own goods, 10 did finishing or printing for others, and 193 did custom spinning or weaving.

STATE.	ESTABLISHMENTS IN THE SILK MANUFACTURING INDUSTRY: 1909			
	Total number.	Dyeing, finishing, or printing—		Doing custom spinning or weaving.
		Their own goods.	For others.	
United States	852	139	10	193
California.....	3	2		
Connecticut.....	47	23	4	13
Delaware.....	3			1
Georgia.....	1			1
Illinois.....	2	1		
Maine.....	4	1		1
Maryland.....	19	7		3
Massachusetts.....	2	2		1
Michigan.....	348	38	5	77
New Jersey.....	170	40	1	16
New York.....	4	1		2
North Carolina.....	226	22		77
Pennsylvania.....	13	1		
Rhode Island.....	7			1
Virginia.....	2			
New Hampshire and Ohio.....				

EQUIPMENT.

Spindles.—Table 33 shows the number of producing and winding spindles reported respectively by the independent throwing plants and by the other silk mills for 1909, 1904, and 1899, so far as comparative figures are available.

KIND.	SPINDLES USED IN THE SILK MANUFACTURING INDUSTRY.					
	1909	1904	1899	Per cent of increase. ¹		
				1899-1909	1904-1909	1899-1904
Producing spindles.....	1,777,962	1,394,020	1,213,493	46.5	27.5	14.0
In independent throwing plants.....	1,129,497	664,236	(²)	.....	70.0	.....
In other silk mills.....	648,465	729,784	(²)	.....	-11.1	.....
Winding spindles.....	637,565	624,688	442,410	44.1	2.1	41.2
In independent throwing plants.....	338,078	150,050	(²)	.....	125.3	.....
In other silk mills.....	299,487	474,636	(²)	.....	-36.9	.....

¹ A minus sign (—) denotes decrease. ² Figures not available.

Table 34 shows, by states, the number of producing and winding spindles in independent throwing plants and in other silk mills, as reported at the census of 1909.

STATE.	SPINDLES USED IN THE SILK MANUFACTURING INDUSTRY: 1909											
	Producing spindles.									Winding spindles.		
	Aggregate.			In independent throwing plants.			In other silk mills.			Total.	In independent throwing plants.	In other silk mills.
	Total.	Spinning and twisting.	Spinning only (spun silk).	Total.	Spinning and twisting.	Spinning only (spun silk).	Total.	Spinning and twisting.	Spinning only (spun silk).			
United States	1,777,962	1,647,415	130,547	1,129,497	1,068,525	60,972	648,465	578,890	69,575	637,565	338,078	289,487
California.....	1,958	1,958					1,958	1,958		1,216		1,216
Connecticut.....	118,302	93,214	25,088	47,480	47,480		70,822	45,734	25,088	53,235	21,620	31,615
Delaware.....	3,264	3,264					3,264	3,264		618		616
Georgia.....	17,136	17,136		17,136	17,136					1,766	1,766	
Illinois.....	3,100	3,100		3,100	3,100					4,200	4,200	
Maine.....	4,740	4,740					4,740	4,740		1,160		1,160
Maryland.....	20,148	20,148		20,148	20,148					6,798	6,780	18
Massachusetts.....	99,699	88,175	11,524	29,707	19,863	9,844	69,992	68,312	1,680	20,418	9,850	10,568
Michigan.....	12,326	12,326					12,326	12,326		10,932		10,932
New Hampshire.....	3,696	3,696		3,696	3,696					896	896	
New Jersey.....	249,644	215,484	34,160	170,801	148,141	22,660	78,843	67,343	11,500	179,161	87,615	91,546
New York.....	159,559	133,254	26,305	127,498	115,698	11,800	32,061	17,556	14,565	69,622	35,271	33,751
North Carolina.....	25,500	25,500		19,500	19,500		6,000	6,000		8,524	7,656	863
Pennsylvania.....	1,017,992	992,242	25,750	650,253	640,585	9,668	367,739	351,657	16,082	267,171	154,196	112,975
Rhode Island.....	7,720		7,720	7,000		7,000				4,222		4,222
Virginia.....	33,178	33,178		33,178	33,178					8,228	8,228	

The percentages of increase during the decade in the number of producing and of winding spindles were practically the same. The increase in the number of winding spindles, however, was confined mainly to the first half of the decade, while the greater part of the increase in the number of producing spindles took place during the five-year period 1904-1909.

There was an increase during the five-year period 1904-1909 in the number of spindles in independent throwing plants corresponding to the marked increase in the amount of silk reported as thrown by such concerns. There was a decrease, however, in the

number in other silk mills, establishments doing weaving being included under the latter head.

Pennsylvania, New Jersey, and New York together reported 80.3 per cent of the total number of producing spindles in 1909, as compared with 82.1 per cent in 1904 and 81.1 per cent in 1899. In 1909 Pennsylvania reported 1,017,992 producing spindles, or 57.3 per cent of the total for the United States, and in 1899, 638,851, or 52.6 per cent of the total. New Jersey shows a decrease both in number of spindles and in the proportion which they represented of the total, reporting 249,644 spindles, or 14 per cent of the total number, in 1909, as compared with 281,590, or 23.2

per cent of the total in 1899. New York, on the other hand, which reported only 63,486 spindles, or 5.2 per cent of the total, in 1899, reported 159,559, or 9 per cent of the total number, in 1909. In Connecticut and Massachusetts, the only other states reporting as many as 50,000 spindles, the number of producing spindles increased 22.7 per cent and 46.4 per cent, respectively, during the decade.

Of the total number of producing spindles in 1909, 1,647,415, or 92.7 per cent, were spinning and twisting spindles, and of these 1,068,525, or 64.9 per cent, were reported by independent throwing plants. The spindles for use in connection with spun silk numbered 130,547, or 7.3 per cent of the total number of producing spindles. These were about equally divided between independent throwing plants and other silk mills.

Spinning and twisting spindles in independent throwing plants were reported from 11 of the 17 states in which the industry was carried on. Pennsylvania led with 640,585, or 60 per cent of the total number, New Jersey was second with 148,141, or 13.9 per cent of the total, and New York third, with 115,698, or 10.8 per cent, these three states together reporting more than five-sixths (84.7 per cent) of the total for the United States. Three states, Pennsylvania, Massachusetts, and New Jersey, reported practically all of this class of spindles employed in the other silk mills, Pennsylvania alone reporting 60.7 per cent.

The spindles used in connection with spun silk in independent throwing plants were confined to five states, New Jersey, New York, Massachusetts, Pennsylvania, and Rhode Island. The use of such spindles in other silk mills was confined to the same five states together with Connecticut.

Winding spindles were reported for every state where the industry was carried on except Ohio. They were fairly well distributed between independent throwing plants and silk mills, the former reporting 53 per cent of the total, distributed through 11 states, and the latter 47 per cent, distributed through 12 states. Pennsylvania led in each case, reporting 154,196 winding spindles in independent throwing establishments, or 45.6 per cent of the total number in this class of establishments, and 112,975 in other silk mills, or 37.7 per cent of the total for such mills.

Table 35 shows, by states, the number of establishments in the industry reporting the throwing of silk in 1909, classified according to the number of spinning and twisting spindles reported. This table does not include the 130,547 spindles used in connection with spun silk.

Of the 245 establishments in the industry which carried on the operation of throwing, 107, or 43.7 per cent, reported less than 2,500 spinning and twisting spindles, and 26 reported 15,000 or over, 18 of the latter

class of establishments being in Pennsylvania. Pennsylvania also contained 18 of the 32 establishments reporting 10,000 and less than 15,000 spinning and twisting spindles. In New Jersey practically two-thirds of the establishments which did throwing had less than 2,500 spinning and twisting spindles. No throwing was reported from Ohio or Rhode Island.

Table 35 ESTABLISHMENTS IN THE SILK MANUFACTURING INDUSTRY ENGAGED IN THROWING SILK: 1909

STATE.	Total number.	Classified according to number of spinning and twisting spindles reported.					Total number of spinning and twisting spindles reported.
		Less than 2,500 spindles.	2,500 spindles but less than 5,000.	5,000 spindles but less than 10,000.	10,000 spindles but less than 15,000.	15,000 spindles or over.	
United States.....	245	107	36	44	32	26	1,647,415
California.....	1	1					1,958
Connecticut.....	30	18	6	4	1	1	93,214
Delaware.....	1		1				3,264
Georgia.....	1					1	17,138
Illinois.....	1		1				3,100
Maine.....	1		1				4,740
Maryland.....	2			1	1		20,142
Massachusetts.....	9	5	1		1	1	88,175
Michigan.....	1				2		12,326
New Hampshire.....	1		1				3,696
New Jersey.....	67	44	7	8	6	2	215,484
New York.....	26	12	4	6	2	2	133,254
North Carolina.....	4		2	1	1		25,500
Pennsylvania.....	94	23	12	23	18	18	992,242
Virginia.....	6	4		1		1	33,178

Looms and Jacquard machines.—Table 36 shows, by states, statistics as to the number of active looms in the industry for 1909, 1904, and 1899.

Table 36 NUMBER OF ACTIVE LOOMS IN THE SILK MANUFACTURING INDUSTRY.

STATE AND CLASS.	1909	1904	1899	Per cent of increase. ¹		
				1899-1909	1904-1909	1899-1904
United States.....	75,406	60,068	44,430	69.7	25.6	35.2
On broad silks (including velvets).....	64,838	50,449	36,989	75.3	28.5	36.4
On ribbons.....	10,670	9,609	7,441	42.1	10.0	29.1
Connecticut.....	5,006	4,260	2,975	68.3	17.5	43.2
On broad silks.....	4,477	3,500	2,681	67.0	27.9	30.5
On ribbons.....	529	760	294	79.9	-30.4	158.5
Massachusetts.....	2,717	1,610	1,040	161.2	62.8	54.8
On broad silks.....	2,708	1,466	896	202.2	34.7	63.6
On ribbons.....	9	144	144	-93.8	-93.8	.....
New Jersey.....	28,915	23,935	20,572	40.6	20.8	18.3
On broad silks.....	24,423	19,917	17,656	38.3	22.6	12.8
On ribbons.....	4,492	4,018	2,916	54.0	11.8	37.8
New York.....	7,575	6,989	5,268	43.8	8.4	32.7
On broad silks.....	5,375	4,761	3,020	78.0	12.9	57.6
On ribbons.....	2,200	2,228	2,248	-2.1	-1.3	-0.9
Pennsylvania.....	26,249	19,336	12,949	102.7	35.8	49.3
On broad silks.....	23,031	16,999	11,161	106.4	35.5	52.3
On ribbons.....	3,218	2,337	1,788	80.0	37.7	30.7
Rhode Island.....	2,511	1,706	533	371.1	47.2	220.1
On broad silks.....	2,511	1,706	533	371.1	47.2	220.1
On ribbons.....						
All other states.....	2,433	2,222	1,093	122.6	9.5	103.3
On broad silks.....	2,311	2,100	1,042	121.8	10.0	101.5
On ribbons.....	122	122	51	139.2	(*)	139.2

¹ A minus sign (-) denotes decrease.
² Less than one-tenth of 1 per cent.

The total number of looms in operation increased from 44,430 in 1899 to 75,406 in 1909, a gain of 69.7 per cent for the decade. The figures include 173 hand looms for 1899 and 283 for 1904, but the number of

hand looms in use in 1909 was not separately reported. The number of looms employed on broad silks and velvets constituted 86 per cent of the total in 1909, 84 per cent in 1904, and 83.3 per cent in 1899. Between 1899 and 1909 the silk mills of New Jersey increased their loom equipment 40.6 per cent, those in Pennsylvania 102.7 per cent, and those in New York 43.8 per cent. The percentages of increase were still higher in Massachusetts and Rhode Island.

Table 37 presents a summary, by states, of the number of the different kinds of looms and the number of Jacquard machines in use in the silk manufacturing industry during 1909.

Table 37 SILK MANUFACTURING INDUSTRY: 1909

STATE.	Looms.					Jacquard machines. ¹
	Total.	Over 36-inch reed space.	36-inch or less reed space.	Velvet.	Ribbon.	
United States	75,406	35,214	28,426	1,198	10,570	3,985
California.....	10	7	3			4
Connecticut.....	5,006	2,692	714	1,071	529	305
Delaware.....	210	57	117		36	
Maine.....	158		158			
Maryland.....	86				86	
Massachusetts.....	2,717	1,801	907		9	211
Michigan.....	716	716				
New Jersey.....	28,915	11,684	12,707	32	4,492	5,797
New York.....	7,575	3,430	1,918	27	2,200	594
North Carolina.....	361	45	316			
Ohio.....	504	504				
Pennsylvania.....	26,249	11,659	11,306	66	3,218	1,874
Rhode Island.....	2,511	2,431	80			
Virginia.....	388	188	200			200

¹ Total number, whether or not connected with looms.

Fourteen of the seventeen states in which the industry was carried on reported looms, but nearly

three-fourths of the total number (73.1 per cent) were in the two leading states, New Jersey and Pennsylvania, which reported 38.3 per cent and 34.8 per cent, respectively, of the total number. New York reported 10 per cent of the total number of looms in operation.

New Jersey and Pennsylvania together reported about two-thirds of the looms of over 36-inch reed space, the number in the two states being practically the same; these states also reported more than five-sixths of the looms of 36-inch reed space or less, the number in New Jersey being somewhat the greater.

Connecticut reported about nine-tenths (89.5 per cent) of the velvet looms, and New Jersey, Pennsylvania, and New York together 93.8 per cent of the ribbon looms, New Jersey alone reporting 42.5 per cent of the total. Six states reported Jacquard machines, nearly two-thirds of the total number being in New Jersey, and over one-fifth in Pennsylvania.

Table 38 presents, by states, a summary of the spindle and loom equipment of the establishments in the silk manufacturing industry in 1909, classified according to mills (1) without spindles or looms; (2) doing spinning and weaving; (3) spinning only; and (4) weaving only.

Of the 852 establishments in the industry in 1909, 44, or 5.2 per cent, reported no looms or throwing or spun silk spindles. These are establishments engaged in the manufacture of braids and bindings, fringes and gimps, cords and tassels, trimmings, embroideries, etc., and equipped with braiders, cord and gimp machines, and other special machinery. New York reported 30 of these establishments.

Table 38 SPINDLE AND LOOM EQUIPMENT IN THE SILK MANUFACTURING INDUSTRY: 1909

STATE.	Total.			Number of establishments without spindles or looms.	Spinning and weaving.			Spinning only.		Weaving only.		Per cent of total.			
	Number of establishments.	Number of spindles.	Number of looms.		Number of establishments.	Number of spindles.	Number of looms.	Number of establishments.	Number of spindles.	Number of establishments.	Number of looms.	Spindles.		Looms.	
												In establishments doing both spinning and weaving.	In establishments doing only spinning.	In establishments doing both spinning and weaving.	In establishments doing only weaving.
United States	852	2,415,527	75,406	44	210	889,956	35,384	247	1,515,571	351	40,012	37.3	62.7	47.0	58.0
California.....	3	3,174	10		1	40	7	1	3,134	1	3	1.3	98.7	70.0	30.0
Connecticut.....	47	171,537	5,006	4	12	82,905	4,294	26	88,632	5	712	48.3	51.7	85.8	14.2
Delaware.....	3	3,880	210		2	3,880	174			1	36	100.0		82.9	17.1
Georgia.....	1	18,902						1	18,902				100.0		
Illinois.....	2	7,300		1				1	7,300				100.0		
Maine.....	1	5,900	158		1	5,900	158					100.0		100.0	
Maryland.....	4	28,946	86		1	18	72	2	26,928	1	14	0.1	99.9	83.7	16.3
Massachusetts.....	19	120,117	2,717	6	79,126	2,003	8	40,991	5	714	65.9	34.1	73.7	26.3	
Michigan.....	2	23,258	716		1	20,258	716	1	3,000			87.1		100.0	
New Hampshire.....	1	4,592						1	4,592				100.0		
New Jersey.....	348	428,805	28,915	6	75	169,345	10,845	68	259,460	199	18,070	39.5	60.5	37.7	63.3
New York.....	170	228,581	7,575	30	40	46,105	3,504	51	182,476	49	4,071	20.2	79.8	46.3	53.7
North Carolina.....	4	34,024	361		1	6,868	361	3	27,156			20.2	79.8	100.0	
Ohio.....	1		504							1	504				100.0
Pennsylvania.....	226	1,285,163	26,249	2	64	480,509	12,333	77	804,594	83	13,916	37.4	62.6	47.0	53.0
Rhode Island.....	13	11,942	2,511	1	6	4,942	927	1	7,000	5	1,584	41.4	58.6	36.9	66.1
Virginia.....	7	41,406	388					6	41,406	1	388	100.0		100.0	

Establishments doing both spinning and weaving formed 24.6 per cent of the total number, and reported 37.3 per cent of the spindles and 46.9 per cent of the looms; establishments doing spinning only formed 29 per cent of the total number and reported 62.7 per cent of the spindles; and establishments doing weaving only formed 41.2 per cent of the total number and reported 53.1 per cent of the looms. Establishments doing weaving only also constituted the

largest of the four groups distinguished in Table 38 in the two leading states, 199 establishments, or 56.7 per cent of the total number, in New Jersey, and 83 establishments, or 23.6 per cent of the total number, in Pennsylvania. In New York the number of establishments doing spinning only was slightly larger than the number doing weaving only. In Connecticut 26 out of 47 establishments were engaged solely in spinning.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the silk manufacturing industry are presented by states in Tables 39 and 40.

Table 39 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 40 gives more detailed statistics for the industry for 1909 only.

SILK AND SILK GOODS, INCLUDING THROWSTERS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1909	852	105,238	664	5,537	99,037	97,947	\$152,158	\$7,527	\$38,570	\$107,767	\$196,912	\$39,145
	1904	824	84,153	526	4,027	79,601	71,760	109,557	4,742	28,768	75,861	133,288	67,427
	1899	483	68,550	477	2,667	65,416	57,397	81,082	3,134	20,982	62,407	107,256	44,849
Connecticut.....	1909	47	9,385	37	645	8,703	8,564	19,730	966	3,749	11,834	21,063	9,229
	1904	43	8,157	38	327	7,792	7,821	16,676	479	3,124	9,098	15,624	6,526
	1899	38	6,860	23	323	6,514	5,415	12,167	403	2,393	7,198	12,379	5,181
Maryland.....	1909	4	681	2	24	655	915	488	32	160	237	512	275
	1904	3	188	.....	13	175	765	421	9	48	171	273	102
	1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts.....	1909	19	4,308	24	175	4,109	5,305	7,801	201	1,840	5,430	8,942	3,512
	1904	18	3,397	10	126	3,261	4,221	5,523	142	1,162	4,157	7,012	2,855
	1899	20	3,277	11	156	3,110	4,331	5,650	227	1,110	3,824	5,958	2,134
New Jersey.....	1909	348	32,365	306	1,774	30,285	22,376	43,615	2,317	13,917	33,265	65,430	32,165
	1904	239	26,986	227	1,278	25,481	16,903	33,645	1,556	9,893	22,339	42,863	20,524
	1899	180	25,313	197	959	24,157	15,964	29,286	1,145	9,233	21,631	39,967	18,336
New York.....	1909	170	14,136	140	1,093	12,903	11,110	20,972	1,493	5,385	13,949	26,519	12,570
	1904	123	12,348	105	960	11,283	7,250	15,751	1,104	4,268	10,400	20,181	9,891
	1899	92	8,318	94	363	7,861	5,111	9,800	514	2,862	6,570	12,706	6,136
Pennsylvania.....	1909	226	38,178	143	1,566	36,469	41,962	49,679	2,132	11,443	35,166	62,061	26,895
	1904	168	28,240	133	1,192	26,915	28,390	31,312	1,300	6,973	24,267	39,334	15,067
	1899	121	21,904	131	745	21,028	23,210	20,894	719	4,630	19,835	31,073	11,188
Rhode Island.....	1909	13	1,750	6	59	1,685	2,318	3,496	80	788	3,188	4,584	1,386
	1904	8	1,325	4	31	1,291	1,645	2,652	41	480	1,696	2,556	860
	1899	6	466	3	8	455	250	680	12	167	819	1,311	492
All other states.....	1909	25	4,435	6	201	4,228	5,397	6,377	278	1,288	4,698	7,801	3,103
	1904	22	3,511	8	100	3,403	4,765	3,577	111	820	3,643	5,445	1,802
	1899	28	2,412	18	103	2,291	3,116	2,605	114	587	2,480	3,862	1,382

¹ Figures can not be shown without disclosing individual operations.

SILK AND SILK GOODS, INCLUDING THROWSTERS—DETAILED STATISTICS, BY STATES: 1909.

Table 40

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.								WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.	
								Maximum month.	Minimum month.						
United States ..	852	105,238	664	1,572	3,060	905	99,037	Mh 100,753	Jy 96,534	102,369	35,785	58,441	2,483	5,660	97,947
Connecticut.....	47	9,385	37	135	418	92	8,703	Se 9,248	Ja 8,370	9,296	4,283	4,614	145	254	8,564
Delaware.....	3	229	.....	6	4	1	218	Mh 246	Oc 188	193	18	154	6	15	205
Maryland.....	4	681	2	8	8	8	655	Ap 717	No 555	663	196	280	58	129	915
Massachusetts.....	19	4,308	24	51	77	47	4,193	De 4,370	Ja 3,745	4,370	1,293	2,607	101	369	5,305
New Jersey.....	348	32,365	306	518	1,032	224	30,285	Mh 30,951	Jy 29,726	31,342	13,628	16,585	398	731	22,376
New York.....	170	14,136	140	274	587	232	12,903	Mh 13,616	Jy 11,726	13,231	4,641	8,255	78	257	11,110
Pennsylvania.....	226	33,178	143	498	817	251	36,469	Ap 37,031	Ja 35,775	37,290	9,772	22,378	1,578	3,562	41,962
Rhode Island.....	13	1,750	6	31	10	18	1,685	No 1,908	Ja 1,452	1,893	825	1,007	13	48	2,318
Virginia.....	7	857	.....	13	21	4	819	De 869	Fe 798	862	335	410	44	73	1,858
All other states ¹ ..	15	3,349	6	38	86	28	3,191	.....	.....	3,229	794	2,151	62	222	3,334

STATE.	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States ..	\$152,158,002	\$177,175,719	\$3,815,770	\$3,711,509	\$38,570,085	\$1,687,981	\$106,078,935	\$1,118,478	\$451,803	\$12,008,744	\$9,732,314	\$196,911,667	\$69,144,751
Connecticut.....	19,730,268	18,022,348	404,230	591,920	3,749,186	214,763	11,619,582	47,287	84,964	369,832	940,584	21,062,687	9,228,342
Delaware.....	175,692	242,568	4,836	2,050	64,223	3,848	147,673	1,550	296	15,229	2,863	255,434	103,913
Maryland.....	487,503	459,727	22,815	9,396	159,943	11,210	225,419	.....	818	7,143	22,983	511,968	275,339
Massachusetts.....	7,800,736	8,337,761	106,004	94,705	1,840,247	82,862	5,346,989	17,330	42,362	504,326	302,936	8,942,246	3,512,395
New Jersey.....	43,615,438	59,576,339	1,201,586	1,115,270	13,917,360	537,514	32,727,663	532,230	145,655	5,503,935	3,895,126	65,429,550	32,164,373
New York.....	20,972,116	23,853,493	709,385	783,908	5,385,355	249,977	13,698,612	325,414	48,145	1,269,206	1,383,491	26,518,821	12,570,232
Pennsylvania.....	49,679,061	55,614,244	1,173,305	958,637	11,442,878	495,850	34,669,721	178,854	94,043	3,851,881	2,749,075	62,061,302	26,895,731
Rhode Island.....	3,495,555	4,210,400	57,010	23,013	788,229	36,091	3,151,594	5,793	13,188	38,524	96,958	4,584,431	1,396,746
Virginia.....	1,226,412	1,491,203	23,307	13,742	260,598	10,164	1,000,729	900	3,541	78,024	100,198	1,543,723	532,830
All other states ¹ ..	4,975,221	5,367,636	113,292	118,868	962,066	45,702	3,490,953	9,120	18,891	370,644	238,100	6,001,505	2,464,850

¹ All other states embrace: California, 3 establishments; Georgia, 1; Illinois, 2; Maine, 1; Michigan, 2; New Hampshire, 1; North Carolina, 4; Ohio, 1.

CORDAGE AND TWINE
AND JUTE AND LINEN GOODS

THE MANUFACTURE OF CORDAGE AND TWINE AND JUTE AND LINEN GOODS.

GENERAL STATISTICS.

Scope of the industry.—This industry includes four classes of establishments, distinguished with respect to their primary products, as follows: (1) Those producing rope, binder twine, and cordage; (2) those producing gunny bagging and other goods in which jute is the principal material; (3) those producing crash, towels and toweling, linen thread, and other goods made chiefly from flax; and (4) those producing nets and seines. Separate statistics for these four classes of establishments are presented in a few of the tables, but in most cases figures are given only for the industry as a whole.

Summary for the four branches of the industry.—Table 1 presents a summary of the statistics of the industry as a whole and of each of the four branches for 1909.

The total value of products and the total cost of materials for the combined industry and for some of its branches involve a large amount of duplication by reason of the use of the products of one establishment as materials for other establishments in the industry or branch. Practically all of the material used in the manufacture of nets and seines, for example, is the product of the cordage and twine factories, and some of the establishments that make cordage and twine use as material yarn produced by other establishments engaged in the same industry. Similar duplications exist in the statistics for the jute goods and linen goods branches of the industry. This duplication must be taken into account in using the figures for statistical purposes. In the value added by manufacture, however, practically all duplication is eliminated, so that this item affords a fair basis for a comparison of the different branches of the industry.

The cordage and twine branch of the industry reported 68.3 per cent of the total number of establishments, 56.7 per cent of the average number of wage earners, and 68.7 per cent of the total value of products; the jute goods branch reported 14.6 per cent of the total number of establishments, 25.8 per cent of the total number of wage earners, and 17.7 per cent of the total value of products; the 15 establishments engaged in making linen goods employed 13.8 per cent of the wage earners and reported 10.5 per cent of the total value of products; and the 13 establishments making nets and seines employed 3.7 per cent of the

wage earners and contributed 3.1 per cent of the total value of products.

Table 1

	CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY: 1909				
	Total for the industry.	Establishments engaged primarily in manufacturing—			
		Cordage and twine.	Jute goods.	Linen goods.	Nets and seines.
Number of establishments.....	164	112	24	15	13
Persons engaged in the industry.....	27,214	15,559	6,901	3,738	1,021
Proprietors and firm members.....	80	61	10	1	8
Salaried employees.....	1,314	869	227	159	59
Wage earners (average number).....	25,820	14,629	6,664	3,573	954
Primary horsepower.....	78,549	47,269	20,993	8,829	1,458
Capital.....	\$76,020,366	\$52,304,938	\$13,789,951	\$7,457,426	\$2,468,051
Expenses.....	56,076,532	38,057,147	10,302,272	5,831,908	1,885,205
Services.....	10,995,545	6,505,512	2,701,172	1,422,099	366,762
Salaries.....	1,862,546	1,201,122	375,531	208,888	77,005
Wages.....	9,132,999	5,304,390	2,325,641	1,213,211	289,757
Materials.....	40,914,810	29,315,402	6,254,918	3,966,572	1,377,918
Miscellaneous.....	4,166,177	2,236,233	1,346,182	443,237	140,525
Value of products.....	61,019,986	41,941,541	10,795,230	6,385,218	1,897,997
Value added by manufacture (value of products less cost of materials).....	20,105,176	12,626,139	4,540,312	2,418,646	520,079

The total cost of the materials used by the establishments in the industry as a whole in 1909 was \$40,914,810, which is equal to a little more than two-thirds (67.1 per cent) of the total value of products, while the value added by manufacture (that is, the value of products less the cost of materials) was \$20,105,176.

Comparative summary for the industry as a whole.—The manufacture of rope and twine was among the earliest industries established in the United States, and statistics for it have appeared in the reports of practically all the censuses of manufactures. The statistics for the censuses prior to 1879, however, are not strictly comparable with those for the more recent years. Table 2 summarizes the statistics for the combined industry for each census from 1879 to 1909, inclusive.

Most of the important items for which comparative figures are given show an increase for each decade covered by the table, the value of products and the cost of materials reported for 1909 being about four times as great as in 1879. Between 1899 and 1909 the average number of wage earners increased 19.3 per cent and the value of products 24.3 per cent. The decrease of 5.6 per cent in the value of products between 1904 and 1909 was due largely to a falling off in the production of binder twine in 1909.

Massachusetts was the most important state in the industry in 1909, ranking first in average number of wage earners, value of products, and value added by manufacture. The number of wage earners employed in the industry in that state increased 30.7 per cent during the decade 1899-1909, and the value of products 35.8 per cent. New York ranked second in 1909, the value of products reported for his state decreasing 23 per cent during the five-year period 1904-1909, although for the decade 1899-1909 this item shows an increase of 4.6 per cent. Other notable increases in value of products from 1899 to 1909 among the less important states in the industry were increases of 174 per cent in Alabama and 135.8 per cent in Rhode Island. A decided decrease, on the other hand, took place in Pennsylvania and in Ohio.

Persons engaged in the industry.—Table 4 shows for 1909 the number of persons engaged in the industry as a whole and in each of the four branches, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the introduction.

The average number of persons engaged in the industry as a whole during 1909 was 27,214, of whom 25,820, or 94.9 per cent, were wage earners, 474, or 1.7 per cent, proprietors and officials, and 920, or 3.4 per cent, clerks, this class including other subordinate salaried employees. Of the total number of wage earners, 51.8 per cent were males, and 48.2 per cent females. Male wage earners predominated only in the cordage and twine branch of the industry, in which they constituted 59.4 per cent of the total number of wage earners. In establishments making jute goods males represented 44.9 per cent of the total number, in those manufacturing linen goods 42.2 per cent, and in those making nets and seines 18.8 per cent.

The 1,763 wage earners under 16 years of age, 50.5 per cent of whom were males and 49.5 per cent females, formed 6.8 per cent of the total number of wage earners. The proportion of children varied decidedly in the different branches of the industry, this class of wage earners constituting 5.7 per cent of the total number in the cordage and twine factories, 5.7 per cent in the jute goods establishments, 10.6 per cent in establishments making linen goods, and 17.3 per cent in those making nets and seines.

The average number of wage earners employed in each state in 1909, 1904, and 1899 is given in Table 3. The average number distributed by sex and age is not shown for the individual states, but Table 19 gives such a distribution of the number employed on December 15, or the nearest representative day, for 1909. Of the total number of male wage earners over 16 years of age employed in the industry as a whole, Mas-

sachusetts reported 26.9 per cent, New York 21.4 per cent, and New Jersey 10.9 per cent, while of the female wage earners 16 years of age or over the proportions in these states were 23.7 per cent, 26.2 per cent, and 11.7 per cent, respectively.

Table 4

BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
Cordage and twine and jute and linen goods.....	27,214	14,526	12,688
Proprietors and officials.....	474	461	13
Proprietors and firm members.....	80	72	8
Salaried officers of corporations.....	150	146	4
Superintendents and managers.....	244	243	1
Clerks.....	920	698	222
Wage earners (average number).....	25,820	13,367	12,453
16 years of age and over.....	24,057	12,477	11,580
Under 16 years of age.....	1,763	890	873
Cordage and twine.....	15,559	9,458	6,101
Proprietors and officials.....	331	320	11
Proprietors and firm members.....	61	53	8
Salaried officers of corporations.....	108	105	3
Superintendents and managers.....	162	162	
Clerks.....	599	449	150
Wage earners (average number).....	14,629	8,689	5,940
16 years of age and over.....	13,793	8,197	5,596
Under 16 years of age.....	836	492	344
Jute goods.....	6,901	3,190	3,711
Proprietors and officials.....	64	63	1
Proprietors and firm members.....	10	10	
Salaried officers of corporations.....	22	21	1
Superintendents and managers.....	32	32	
Clerks.....	173	137	36
Wage earners (average number).....	6,664	2,990	3,674
16 years of age and over.....	6,281	2,769	3,512
Under 16 years of age.....	383	221	162
Linen goods.....	3,733	1,646	2,087
Proprietors and officials.....	47	47	
Proprietors and firm members.....	1	1	
Salaried officers of corporations.....	15	15	
Superintendents and managers.....	31	31	
Clerks.....	113	90	23
Wage earners (average number).....	3,573	1,509	2,064
16 years of age and over.....	3,194	1,350	1,844
Under 16 years of age.....	379	159	220
Nets and seines.....	1,021	232	789
Proprietors and officials.....	32	31	1
Proprietors and firm members.....	8	8	
Salaried officers of corporations.....	5	5	
Superintendents and managers.....	19	18	1
Clerks.....	35	22	13
Wage earners (average number).....	954	179	775
16 years of age and over.....	789	161	628
Under 16 years of age.....	165	18	147

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison for the industry as a whole is made in Table 5.

Table 5 PERSONS ENGAGED IN THE CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY.

CLASS.	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total	27,214	100.0	26,442	100.0	2.9
Proprietors and firm members	80	0.3	60	0.2	33.3
Salaried employees	1,314	4.8	1,050	4.0	25.1
Wage earners (average number) ..	25,820	94.9	25,332	95.8	1.9

The average number of wage earners increased only 1.9 per cent from 1904 to 1909, while the proportion which they formed of the total number of persons engaged in the industry decreased slightly. The number of salaried employees increased 25.1 per cent during the five-year period, and the proportion which such employees formed of the total also increased.

Table 6 shows the average number of wage earners in the industry as a whole distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

A noteworthy fact brought out in this table is the decrease in the number of children employed as wage earners and in their proportion of the total. The

number of males over 16 years of age increased 23.8 per cent during the decade and the number of females 24.6 per cent, almost the entire increase among the men taking place in the first half of the decade.

Table 6 AVERAGE NUMBER OF WAGE EARNERS IN THE CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total	25,820	100.0	25,332	100.0	21,651	100.0
16 years of age and over ..	24,057	93.2	23,215	91.6	19,373	89.5
Male	12,477	48.3	12,427	49.0	10,079	46.6
Female	11,580	44.9	10,788	42.6	9,294	42.9
Under 16 years of age	1,763	6.8	2,117	8.4	2,278	10.5

Wage earners employed, by months.—Table 7 gives for the industry as a whole the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 in the eight states in which an average of 500 or more wage earners were employed in the industry during the year and for which the statistics can be given separately without disclosing individual operations.

Table 7 WAGE EARNERS EMPLOYED IN THE CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	25,820	26,337	26,594	26,698	26,449	26,084	25,688	25,712	25,220	25,703	25,539	24,313	25,522
Illinois	1,799	1,782	1,780	1,754	1,737	1,755	1,779	1,782	<i>1,619</i>	1,783	1,777	1,905	2,147
Kentucky	751	742	752	759	761	740	749	730	<i>621</i>	718	821	814	808
Massachusetts	6,690	7,077	7,090	7,109	7,132	7,070	6,991	6,948	6,851	6,839	6,397	<i>5,188</i>	5,578
Missouri	820	835	852	828	804	832	801	800	<i>791</i>	836	806	801	858
New Jersey	3,025	3,075	3,085	3,081	3,052	2,975	2,985	<i>2,963</i>	2,988	2,983	2,997	3,027	3,086
New York	5,952	5,856	5,973	6,069	6,005	6,014	<i>5,716</i>	5,851	5,983	5,985	5,963	5,973	6,040
Ohio	791	900	922	930	932	802	745	738	<i>498</i>	678	735	715	897
Pennsylvania	2,119	2,095	2,123	2,116	2,053	<i>2,000</i>	2,053	2,104	2,140	2,179	2,176	<i>2,196</i>	2,193

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

This table shows that the industry as a whole is not subject to any considerable seasonal variation. The largest number of wage earners reported for any month of 1909 was 26,698, in March, and the smallest number, 24,313, in November, the minimum number being equal to 91.1 per cent of the maximum. In 1904 conditions were practically the same, the maximum number, 26,117, being reported for April, and the minimum number, 24,275, equal to 92.9 per cent of the maximum, for September. In some of the individual states, however, considerable variation is shown, the minimum number of wage earners employed in any month of 1909 being equal to only 72.7 per cent of the maximum in Massachusetts and 75.4 per cent in Illinois. In New York the minimum number was equal to 94.2 per cent of the maximum, and in New Jersey, to 95.7 per cent.

The months of maximum and minimum employment in 1909, and the number of wage earners reported

for these months, are given for a larger number of states in Table 19.

Prevailing hours of labor.—In Table 8 the wage earners in the industry as a whole have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Nearly two-thirds (63 per cent) of the wage earners employed in the industry as a whole in 1909 were in establishments where the prevailing hours per week were more than 54 but less than 60, this being the most common working time in seven of the eight states shown in the table, while practically all (96.1 per cent) were employed in establishments where the

prevailing hours were from 54 to 60 per week, inclusive. Only 2.6 per cent worked in establishments where the prevailing hours of employment were more than 60 per week, and only 1.3 per cent in establishments where the prevailing hours were less than 54 per week.

the value of their products represented 96.4 per cent of the total value of products for the industry in 1909 and 97 per cent in 1904.

Table 8

AVERAGE NUMBER OF WAGE EARNERS IN THE CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—					
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.
		United States.....	25,820	138	208	2,605	16,279	6,023	667
Illinois.....	1,799	5	65	.....	1,570	164	.....
Kentucky.....	751	5	.....	.....	746	.....	.....
Massachusetts.....	6,690	52	1	1,347	5,268	5	17
Missouri.....	820	.....	.....	52	768	.....	.....
New Jersey.....	3,025	1	.....	301	2,671	52	.....
New York.....	5,952	.....	.....	3	3,269	2,680	.....
Ohio.....	791	.....	.....	.....	637	154	.....
Pennsylvania.....	2,119	49	111	.....	1,110	849	.....

Character of ownership.—Table 9 presents statistics with respect to the character of ownership of the establishments in the industry.

Establishments under corporate ownership formed 69.5 per cent of the total number of establishments in 1909, as compared with 70.3 per cent in 1904, while

Table 9

CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY.

CHARACTER OF OWNERSHIP.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
	Total.....	184	145	61,019,988	64,684,241
Individual.....	33	133	1,011,355	1,136,074
Firm.....	17	10	1,171,345	819,956
Corporation.....	2 114	102	2 58,837,286	62,707,611
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	20.1	1 22.8	1.7	1.8
Firm.....	10.4	6.9	1.9	1.3
Corporation.....	2 69.5	70.3	2 96.4	97.0

¹ Includes one establishment under another form of ownership, to avoid disclosure of individual operations.

² Includes one establishment under cooperative ownership, to avoid disclosure of individual operations.

Table 10 gives statistics for establishments classified according to form of ownership for each state in which an average of more than 500 wage earners were employed in 1909, and for which separate figures can be shown without disclosing individual operations. The one establishment under cooperative ownership has in this table been included with those under corporate ownership.

Table 10

CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY: 1909

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
Illinois.....	.....	.....	7	.....	.....	1,799	.....	.....	8,237,165	.....	.....	2,295,534
Kentucky.....	1	.....	5	(X)	.....	751	(X)	.....	1,079,570	(X)	.....	370,473
Massachusetts.....	7	5	19	69	201	6,420	171,684	273,280	16,186,679	50,606	136,507	5,246,824
New Jersey.....	1	.....	11	(X)	.....	3,025	(X)	.....	5,526,721	(X)	.....	1,631,021
New York.....	3	2	11	149	(X)	5,803	300,907	(X)	11,914,093	115,696	(X)	4,510,354
Ohio.....	1	1	6	(X)	(X)	791	(X)	(X)	2,727,854	(X)	(X)	743,825
Pennsylvania.....	9	1	8	205	(X)	1,914	350,166	(X)	4,454,609	126,329	(X)	1,677,030

NOTE.—In some states, in order to avoid disclosing individual operations, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. One establishment under cooperative ownership is included with those under corporate ownership.

Establishments under corporate ownership outnumbered both of the other classes combined in all of the states shown in the table except Pennsylvania, and in this state, although such establishments formed only 44.4 per cent of the total number, they gave employment to 90.3 per cent of the wage earners and contributed 92.7 per cent of the total value of products for the industry.

Size of establishments.—Table 11 presents statistics for 1909 and 1904 for the establishments in the industry as a whole grouped according to the value of their products.

Establishments with products valued at \$1,000,000 or over constituted the most important class, as measured by value of products, in both 1909 and 1904, reporting 54.3 per cent of the total for the industry in 1909 and 60.2 per cent in 1904. The number of such establishments decreased from 15 to 12 during the 5-year period, while the aggregate value of their products decreased \$5,806,472, or 15 per cent. The other groups shown in the table, except that comprising the very smallest establishments, show an increase both in number of establishments and in value of products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	164	145	\$61,019,986	\$64,664,241
Less than \$5,000.....	12	14	32,089	36,207
\$5,000 and less than \$20,000.....	20	13	218,217	119,674
\$20,000 and less than \$100,000.....	48	139	2,738,115	1,2,053,652
\$100,000 and less than \$1,000,000.....	72	64	24,887,181	23,503,852
\$1,000,000 and over.....	12	15	33,144,384	38,950,856
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	7.3	9.7	0.1	0.1
\$5,000 and less than \$20,000.....	12.2	9.0	0.4	0.2
\$20,000 and less than \$100,000.....	29.3	126.9	4.5	13.2
\$100,000 and less than \$1,000,000.....	43.9	44.1	40.8	36.3
\$1,000,000 and over.....	7.3	10.3	54.3	60.2

¹ Includes one establishment with products valued at \$5,000 and less than \$20,000.

Table 12 shows for the industry as a whole, and for each of its four branches, the average number of wage earners, value of products, and value added by manufacture per establishment for 1909 and 1899.

During the decade 1899-1909 the average value of products per establishment for the industry as a whole increased from \$306,735 to \$372,073, the average value added by manufacture from \$100,086 to \$122,593, and

the average number of wage earners per establishment from 135 to 157. Of the four branches of the industry, the establishments engaged in manufacturing jute goods showed the largest averages for 1909, while those manufacturing linen goods showed the largest gains in these averages from 1899 to 1909.

BRANCH OF INDUSTRY.	AVERAGE PER ESTABLISHMENT.		
	Number of wage earners.	Value of products.	Value added by manufacture.
The industry as a whole:			
1909.....	157.4	\$372,073	\$122,593
1899.....	135.3	\$306,735	\$100,086
Cordage and twine:			
1909.....	130.6	374,478	112,733
1899.....	124.9	360,473	106,835
Jute goods:			
1909.....	277.7	449,801	189,180
1899.....	250.3	299,100	131,580
Linen goods:			
1909.....	238.2	425,681	161,243
1899.....	182.4	242,676	100,980
Nets and seines:			
1909.....	73.4	146,000	40,006
1899.....	39.4	77,685	32,111

Table 13 classifies the establishments in each of the nine leading states according to the number of wage earners employed.

STATE.	CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY.																				
	Total.		Establishments employing in 1909—																		
			No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		over 1,000 wage earners.			
Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States	164	25,820	2	20	53	31	371	26	946	26	1,863	34	5,068	12	4,407	8	5,071	5	3,043		
Illinois.....	7	1,799				2	17			1	56	2	296			2	1,430				
Kentucky.....	6	751			5			1	23	1	89	2	229	1	405						
Massachusetts.....	31	6,680	1	7	21	5	68	3	115	1	82	10	1,727	1	417	1	635	2	3,625		
Missouri.....	4	820								1	52	1	190	2	578						
New Jersey.....	12	3,025		1	1	1	12	1	40	2	142	2	226	3	1,065	1	510	1	1,029		
New York.....	16	5,952		3	6			2	66	1	80	5	744	2	840	1	827	2	3,389		
Ohio.....	8	791				1	7			2	104	5	680								
Pennsylvania.....	18	2,119		3	10	6	78	1	26	3	203	2	229	1	473	2	1,100				

Of the 164 establishments reported in 1909, 1.2 per cent employed no wage earners, 31.1 per cent employed from 1 to 20 wage earners, 31.7 per cent from 21 to 100, 28 per cent from 101 to 500, and 7.9 per cent over 500. Of the wage earners, 1.6 per cent were in establishments reporting from 1 to 20 wage earners each, 10.9 per cent in those employing from 21 to 100, 36.7 per cent in those employing from 101 to 500, and 50.8 per cent in the thirteen establishments employing more than 500.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no

account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$56,076,532, distributed as follows: Cost of materials, \$40,914,810, or 73 per cent; wages, \$9,132,999, or 16.3 per cent; salaries, \$1,862,546, or 3.3 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$4,166,177, or 7.4 per cent.

The following table gives, for the four branches of the industry, the percentages of the total reported expenses represented by the several classes in 1909:

BRANCH OF INDUSTRY.	PER CENT OF TOTAL REPORTED EXPENSES.			
	Cost of materials.	Salaries.	Wages.	Miscellaneous expenses.
The industry as a whole.....	73.0	3.3	16.3	7.4
Cordage and twine.....	77.0	3.2	13.9	5.9
Jute goods.....	60.7	3.6	22.6	13.1
Linen goods.....	68.0	3.6	20.8	7.6
Nets and seines.....	73.1	4.1	15.4	7.5

The cost of materials represented a smaller proportion of the total expenses and wages a larger proportion in the jute goods and the linen goods branches of the industry than in the other two branches. This condition is largely due to the more complicated manufacturing operations carried on in these two branches.

Engines and power.—Comparable figures as to the amount of power used in the industry as a whole are not available for the census of 1879, but Table 2 shows that the power employed in the industry increased from 27,911 horsepower in 1889 to 78,549 horsepower in 1909. Table 15 shows the statistics of power as reported for the industry as a whole at the censuses of 1909, 1904, and 1889.

The total primary power used in the industry increased from 47,999 horsepower in 1899 to 78,549 horsepower in 1909, or 63.6 per cent. In 1899 steam power constituted slightly more than four-fifths of the total primary power, but in spite of a considerable increase between 1899 and 1909, formed only about three-fourths of the total in 1909. Water power, on the other hand, formed 20.1 per cent of the total

primary power in 1909, as compared with 17.2 per cent in 1899, and rented electric power formed 3.4 per cent of the total in 1909, as against seven-tenths of 1 per cent in 1899.

The horsepower of motors used for distributing power by means of current generated in the establishments in the industry increased from 1,596 in 1899 to 13,294, or nearly nine times as much, in 1909.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	473	321	243	78,549	66,244	47,999	100.0	100.0	100.0
Owned.....	301	301	248	75,908	65,234	47,673	96.6	98.5	99.3
Steam.....	197	208	159	58,855	52,532	38,473	74.9	79.3	80.2
Gas.....	14	7	11	1,285	103	951	1.6	0.2	2.0
Water wheels.....	89	85	78	15,761	12,589	8,249	20.1	19.0	17.2
Water motors.....	1	1	(1)	7	10	(1)	(2)	(2)	.....
Other.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rented.....	172	20	(1)	2,641	1,010	326	3.4	1.5	0.7
Electric.....	172	20	(1)	2,522	759	28	3.2	1.1	0.1
Other.....	.....	.....	.....	119	251	298	0.2	0.4	0.6
Electric motors.....	570	211	44	15,816	8,293	1,624	100.0	100.0	100.0
Run by current generated by establishment.....	398	191	44	13,294	7,534	1,596	84.1	90.8	98.3
Run by rented power.....	172	20	(1)	2,522	759	28	15.9	9.2	1.7

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 16 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in the industry as a whole in each of the eight leading states.

STATE.	Number of establishments reporting.	Total horsepower.	Primary horsepower.							Electric horsepower.		Fuel used.					
			Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.					
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
United States.....	156	78,549	75,908	58,855	1,285	15,768	.....	2,522	119	15,816	13,294	69,397	181,462	.....	392	22,113	31,273
Illinois.....	7	6,459	6,310	6,300	10	.....	.....	149	.....	261	112	.....	36,293	.....	.....	30	.....
Kentucky.....	5	1,801	1,850	1,400	.....	250	.....	151	.....	161	10	.....	13,375	.....	.....	.....	.....
Massachusetts.....	29	24,864	24,769	12,180	1,204	11,385	.....	36	59	5,793	5,757	2,633	40,425	.....	59	2,031	812
Missouri.....	4	1,683	1,683	1,683	.....	.....	.....	.....	.....	.....	.....	.....	9,498	.....	.....	.....	.....
New Jersey.....	11	6,442	6,440	6,380	.....	60	.....	.....	2	2,213	2,211	27,095	1,223	.....	.....	.....	.....
New York.....	14	15,056	14,764	14,386	8	370	.....	.....	292	3,629	3,337	26,748	32,532	.....	.....	.....	377
Ohio.....	8	3,225	3,225	3,205	20	.....	.....	.....	.....	75	75	.....	13,390	.....	.....	.....	200
Pennsylvania.....	17	4,630	4,593	4,462	11	120	.....	.....	37	230	193	12,773	7,534	.....	2	120	381
All other states.....	61	14,389	12,474	8,859	32	3,583	.....	1,855	60	3,454	1,599	148	27,192	.....	331	19,932	29,503

In 1909, Massachusetts, New York, Illinois, and New Jersey, together reported 52,821 horsepower, or 67.2 per cent of the aggregate for the industry. Steam was the most important form of power in all of the states shown separately in the table. The largest amount of steam power, 14,386 horsepower, is shown for New York, and the largest

amount of water power, 11,385 horsepower, for Massachusetts.

Fuel consumed.—Bituminous coal was the principal kind of fuel used in 1909, the largest amount being reported by establishments in Massachusetts. The largest amount of anthracite coal was reported by establishments in New Jersey.

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

Materials.—Table 17 shows the quantity and cost of the materials used in the industry as a whole in 1909 and 1899, and the percentages of increase for each item. The fibers reported for the census years 1909 and 1899 as used in the manufacture of cordage and twine and jute and linen goods are assembled in three groups, hard fibers, soft fibers, and cotton. The hard fibers are those that form a structural part of the leaf of the plants from which they are derived and include manila hemp, sisal, New Zealand hemp, and istle or tampico fiber. The soft fibers include those found within the stem of the plant from which they are derived, such as true hemp, flax, and jute. In addition to the long, clean fibers of flax, hemp, and jute, there are used short and otherwise imperfect fibers of the same plants. In the case of flax and hemp these are called "tow," and in the case of jute they are known as "butts" or "rejections."

MATERIAL.	MATERIALS USED IN THE MANUFACTURE OF CORDAGE AND TWINE AND JUTE AND LINEN GOODS.		
	1909	1899	Per cent of increase: ¹ 1899-1909
Total	\$40,914,810	\$33,063,793	23.7
Hard fibers:			
Sisal and manila hemp—			
Pounds.....	335,460,574	269,594,673	24.4
Cost.....	\$19,314,306	\$17,743,624	8.9
Other kinds—			
Pounds.....	17,222,998	6,344,371	171.5
Cost.....	\$707,802	\$352,528	100.3
Soft fibers:			
Jute—			
Pounds.....	121,992,427	87,443,201	39.5
Cost.....	\$4,134,265	\$2,431,429	70.0
Jute butts—			
Pounds.....	138,364,122	118,806,625	16.5
Cost.....	\$2,033,176	\$1,795,653	13.2
Flax and flax tow—			
Pounds.....	26,954,785	16,960,646	58.7
Cost.....	\$3,174,609	\$2,080,862	52.6
Hemp and hemp tow—			
Pounds.....	19,724,070	25,588,715	-22.9
Cost.....	\$1,496,125	\$1,404,653	6.5
Cotton:			
Pounds.....	27,624,490	13,022,755	112.1
Cost.....	\$2,922,933	\$849,426	244.1
Yarns, purchased:			
Cotton—			
Pounds.....	7,077,959	4,973,080	42.3
Cost.....	\$1,291,599	\$709,889	81.9
Flax, hemp, jute, and ramie—			
Pounds.....	2,676,367	1,890,792	41.5
Cost.....	\$445,378	\$304,161	46.4
All other materials	\$5,394,617	\$5,391,568	0.1

¹ A minus sign (-) denotes decrease.

The total cost of the materials used in the industry increased from \$33,063,793 in 1899 to \$40,914,810 in 1909, or 23.7 per cent. Of the total for 1909, the cost of hard fibers represented 48.9 per cent; that of soft fibers, 26.5 per cent, that of cotton, 7.1 per cent, and that of yarns, 4.2 per cent; the corresponding percentages for 1899 were 54.7, 23.3, 2.6, and 3.1, respectively.

Sisal and manila hemp constituted 95.1 per cent of the total quantity of hard fibers used in 1909, and 97.7 in 1899. Jute and jute butts combined constituted 84.8 per cent of the total quantity of soft fibers used in 1909, as compared with 82.9 per cent of that used in 1899. Of the materials shown separately in the table,

"other" hard fibers show the largest percentage of increase in quantity (171.5), while cotton shows the largest relative increase in cost (244.1 per cent).

Products.—Table 18 shows the quantity and value of the principal products of the industry as a whole for 1909 and 1899.

PRODUCT.	PRODUCTS OF THE CORDAGE AND TWINE AND JUTE AND LINEN GOODS INDUSTRY.		
	1909	1899	Per cent of increase: ¹ 1899-1909
Total value	\$261,019,986	\$49,077,629	24.3
Rope and binder twine	\$33,930,306	\$26,909,027	26.1
Rope—			
Pounds.....	239,031,893	141,841,052	68.5
Value.....	\$19,850,635	\$12,723,446	56.0
Binder twine—			
Pounds.....	189,172,151	165,609,429	14.2
Value.....	\$14,079,671	\$14,185,581	-0.7
Sisal—			
Pounds.....	225,756,526	172,238,291	31.1
Value.....	\$15,960,280	\$14,005,566	14.0
Manila—			
Pounds.....	150,169,682	123,584,201	21.5
Value.....	\$12,892,347	\$12,192,798	5.7
Cotton rope—			
Pounds.....	10,760,763	1,615,824	937.3
Value.....	\$3,011,613	\$247,250	1,118.0
Jute rope—			
Pounds.....	27,749,512	10,012,165	177.2
Value.....	\$1,566,100	\$463,413	238.0
All other—			
Pounds.....	7,767,561	(²)	.....
Value.....	\$499,906	(²)	.....
Twine, other than binder twine	\$8,934,352	\$4,341,441	105.8
Cotton—			
Pounds.....	20,412,631	8,691,707	134.9
Value.....	\$3,513,036	\$1,135,640	210.3
Jute—			
Pounds.....	35,516,217	1,679,127	2,015.2
Value.....	\$2,557,744	\$117,539	2,076.1
Hemp—			
Pounds.....	8,013,349	9,065,024	-11.6
Value.....	\$1,091,291	\$1,019,590	7.0
Flax—			
Pounds.....	2,967,053	3,845,978	-22.9
Value.....	\$30,969	\$90,469	-14.3
Flax or hemp mixed with jute—			
Pounds.....	8,907,403	12,924,667	-31.1
Value.....	\$936,312	\$1,101,203	-15.0
Yarns for sale	\$5,434,037	\$4,455,734	22.0
Jute—			
Pounds.....	62,512,247	54,271,860	15.2
Value.....	\$4,361,550	\$3,230,535	35.0
Flax and hemp—			
Pounds.....	5,486,891	8,259,653	-33.6
Value.....	\$982,742	\$1,125,971	-12.7
Other—			
Pounds.....	732,120	946,567	-22.7
Value.....	\$89,745	\$98,928	-9.3
Linen thread:			
Pounds.....	6,530,503	4,021,044	62.4
Value.....	\$3,107,008	\$2,332,237	46.1
Gunny bagging:			
Square yards.....	69,311,288	74,090,760	-6.5
Value.....	\$3,507,482	\$3,462,479	1.3
Jute carpets and rugs:			
Square yards.....	2,206,114	2,953,658	-25.3
Value.....	\$519,221	\$357,568	53.6
All other products	\$5,257,580	\$7,219,093	-27.2

¹ A minus sign (-) denotes decrease.

² In addition, cordage and twine and jute and linen goods to the value of \$890,629 were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

³ Not reported.

The total production of rope and twine in 1909 (exclusive of the production in penal institutions) was 512,196,164 pounds; of this amount 504,020,697 pounds were made by establishments in the cordage and twine and jute and linen goods industry, as shown in Table 18, while 8,175,467 pounds were produced by establishments in other industries.

DYEING AND FINISHING TEXTILES

THE DYEING AND FINISHING OF TEXTILES.

GENERAL STATISTICS.

Scope of the industry.—The census classification "dyeing and finishing textiles" includes all establishments engaged primarily in the dyeing and finishing of textiles. It covers the bleaching, dyeing, and mercerizing of raw fibers, and of yarns and woven cloth, and the printing of piece goods, and also includes establishments engaged in the beaming and winding of yarns and in the spooling of thread, as well as a few establishments engaged in dyeing and bleaching straw braids. Although some establishments make a specialty of dyeing and finishing silk yarns and fabrics, and a number specialize in work on other classes of textiles, so large a number dye and finish more than one variety of fabric that it is impossible to compile statistics which will correctly represent the work done on any particular class.

A considerable number of the cotton, silk, and woolen mills carry on, in the same establishment, one or more of these subordinate processes in connection with the manufacture of textiles, and where practicable, separate returns were secured for the dyeing and finishing departments of such mills, in which case these departments were treated as separate establishments and the statistics concerning them were included in the present report on the dyeing and finishing industry. Most of these mills, however, made no separate report

for the operations of the dyeing and finishing department, such statistics being included with those for the entire establishment in a single report. The statistics for the dyeing and finishing industry, therefore, do not fully cover the dyeing and finishing operations carried on in connection with the textile industries.

Comparison with earlier censuses.—Statistics for the dyeing and finishing industry were first obtained at the census of 1849, when 42 establishments were reported, giving employment to an average of 4,080 hands. The returns for cost of materials and value of products included the value of the cloth treated and are therefore not comparable with those for later censuses, but the value added by manufacture was \$3,218,761. At the census of 1859 there were 29 establishments engaged in the industry, giving employment to an average of 4,005 hands and reporting products to the value of \$7,971,064; the value added by manufacture was \$4,086,249. At the census of 1869, 42 establishments, employing an average of 8,894 hands, were reported; the value of the cloth treated was included with the value of products at this census also, but the value added by manufacture amounted to \$8,072,686.

Table 1 summarizes the statistics for the industry for each census from 1879 to 1909, inclusive.

	Number or amount.					Per cent of increase. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
	Number of establishments.....	426	360	298	248	191	43.0	18.3	20.8	20.2	28.8
Persons engaged in the industry.....	47,303	38,071	31,394	(²)	(²)	50.7	24.2	21.3	.....	.....
Proprietors and firm members.....	318	310	300	(²)	(²)	6.0	2.6	3.3	.....	.....
Salaried employees.....	2,939	2,196	1,318	(²)	(²)	123.0	33.8	66.6	.....	.....
Wage earners (average number).....	44,046	35,565	29,776	19,601	16,698	47.9	23.8	19.4	(³)	(³)
Primary horsepower.....	107,746	84,868	69,238	57,035	(²)	55.6	27.0	22.6	21.4	.....
Capital.....	\$114,092,654	\$88,708,576	\$60,643,104	\$38,450,800	\$26,223,981	88.1	28.6	46.3	57.7	46.6
Expenses.....	68,647,853	44,476,116	37,089,528	25,233,312	20,138,659	85.1	54.3	19.9	47.0	25.3
Services.....	26,261,634	18,876,586	14,993,444	9,717,011	6,474,364	75.2	39.1	25.9	54.3	50.1
Salaries.....	5,034,710	3,407,381	2,267,128	(²)	(²)	122.1	47.8	50.3	.....	.....
Wages.....	21,226,924	15,469,205	12,726,316	(²)	(²)	66.8	37.2	21.6	.....	.....
Materials.....	35,261,301	19,621,253	17,958,137	12,385,220	13,664,295	96.4	79.7	9.3	45.0	-9.4
Miscellaneous.....	7,124,918	5,978,277	4,137,947	3,131,081	(²)	72.2	19.2	44.5	32.2	.....
Value of products.....	83,556,432	50,849,545	44,963,331	28,900,560	32,297,420	85.8	64.3	13.1	55.6	-10.5
Value added by manufacture (value of products less cost of materials).....	48,295,131	31,228,292	27,005,194	16,515,340	18,633,125	78.8	54.7	15.6	63.5	-11.4

¹ A minus sign (-) denotes decrease. Where the percentages are omitted, comparable figures can not be given.
² Comparable figures not available.
³ Figures not strictly comparable.

The number of independent dyeing and finishing establishments shows a considerable increase for each of the intercensal periods covered by the table, the number in 1909 being more than twice that in 1879.

A substantial increase in value of products took place during each of the decades between 1889 and 1909; there was a decrease of 10.5 per cent, however, during the decade 1879-1889, this decrease probably being

due to the fact that competition and improved processes had reduced the rates charged for work done.¹ The value of products in 1909 was more than two and one-half times that in 1879. Between 1899 and 1909 the average number of wage earners increased 14,270, or 47.9 per cent, and the value of products \$38,593,101, or 85.8 per cent, the greater part of these increases taking place during the second half of the decade. In general, the cost of materials consists chiefly of the amount expended for dyestuffs and other chemicals used, and the value of products represents the amount which is charged for performing the dyeing and finishing processes, the goods dyed or finished in most instances belonging to other concerns; but in some instances the goods dyed or finished are owned by the establishments which perform these final operations and under such circumstances the cost of the fabric is included in the cost of materials while the value of the finished cloth is included in the value of products. The large increases in cost of materials and value of products shown for the five-year period 1904-1909, therefore, may be due in part to the fact that a larger proportion of the value of the fabrics treated was included in the cost of materials in 1909 than in 1904.

¹ Eleventh Census of the United States, 1890, Part III, Selected Industries, page 231.

At the census of 1909, 426 establishments were returned as engaged in the dyeing and finishing industry, these establishments giving employment to an average of 47,303 persons during the year, paying out \$26,261,634 in salaries and wages, and reporting products to the value of \$83,556,432, to produce which materials costing \$35,261,301 were utilized. The value added by manufacture—that is, the value of products less the cost of materials—was \$48,295,131, equal to 57.8 per cent of the total value of products.

Summary, by states.—Table 2 summarizes the more important statistics of the industry by states, the states being arranged according to the value of products reported for 1909. The states shown in this table are given their actual ranking among all states, the rank of certain states for which figures can not be presented being higher than that of some named in the table. The extent to which the establishments in the several states owned the materials upon which they worked greatly influences their rank in value of products, and no doubt largely accounts for the seeming discrepancy between the proportion of the total value of products contributed by certain states as compared with the proportion which the same states contributed of the total number of wage earners, or the value added by manufacture.

Table 2

	Number of establishments: 1909	DYEING AND FINISHING TEXTILES.																				
		Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹											
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).		Value of products.		Value added by manufacture.				
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States.	426	44,046	100.0	.....	.....	\$83,556,432	100.0	.....	.....	\$48,295,131	100.0	.....	.....	47.9	23.8	19.4	85.8	64.3	13.1	78.8	54.7	15.6
Massachusetts....	48	9,079	20.6	2	3	21,892,880	26.2	1	2	11,423,624	23.7	1	2	94.1	20.9	60.5	146.9	98.1	24.6	98.4	66.3	19.3
New Jersey.....	67	10,129	23.0	1	1	15,795,788	18.9	2	1	9,443,092	19.6	2	1	43.2	33.3	7.4	50.6	31.9	14.2	31.9	36.3	15.9
Rhode Island....	45	7,792	17.7	3	2	13,955,700	16.7	3	3	8,636,419	17.9	3	3	31.1	3.0	27.3	64.5	39.8	17.6	60.0	36.2	17.5
Pennsylvania....	135	6,086	13.8	4	4	12,059,297	14.4	4	4	6,728,610	13.9	4	4	29.0	32.7	-2.8	71.3	77.7	-3.6	74.2	64.7	5.7
New York.....	81	5,252	11.9	5	5	9,673,228	11.6	5	5	5,533,967	11.5	5	5	68.5	46.5	15.0	166.8	121.8	20.3	148.8	83.1	35.9
Connecticut.....	10	1,719	3.9	6	6	3,561,927	4.3	6	6	2,081,859	4.3	6	6	32.2	22.3	8.2	56.9	60.8	-2.4	52.8	61.6	-5.5
Ohio.....	6	184	0.4	11	.....	423,144	0.5	10	.....	180,368	0.4	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois.....	12	172	0.4	12	12	362,787	0.4	11	14	257,303	0.5	10	12	.....	39.8	.....	.....	125.5	317.2	.....	.....	96.9
North Carolina...	4	330	0.7	10	10	306,853	0.4	13	10	194,327	0.4	11	10	79.3	9.6	63.6	74.4	22.3	42.6	139.5	17.6	.....
Maryland.....	3	79	0.2	17	.....	126,570	0.2	17	.....	65,085	0.1	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states..	15	3,224	7.3	.....	.....	5,398,248	6.5	.....	.....	3,749,577	7.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 14. A minus sign (-) denotes decrease. Percentages not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.

In 1909 Massachusetts ranked first in respect to value of products, reporting 26.2 per cent of the total for the industry in the United States, and in value added by manufacture, but was second in average number of wage earners, New Jersey ranking first in this respect. The number of wage earners employed in the industry in Massachusetts increased 94.1 per cent during the decade ending with 1909, and the value of products 146.9 per cent. In 1909 New Jersey ranked second in value of products and value added by manufacture, having dropped from first place since

1904. Rhode Island ranked third in value of products and in value added by manufacture in both 1909 and 1904, and third in number of wage earners in 1909, having changed places with Massachusetts since 1904. Of the states for which the percentages of increase are given in the table, New York shows the largest relative gain from 1899 to 1909 in value of products and value added by manufacture, the increases being 166.8 per cent and 148.8 per cent, respectively; Massachusetts, however, shows the largest percentage of increase in number of wage earners.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE DYEING AND FINISHING OF TEXTILES: 1909		
	Total	Male.	Female.
All classes.....	47,303	38,581	8,722
Proprietors and officials.....	1,218	1,190	28
Proprietors and firm members.....	318	308	10
Salaried officers of corporations.....	289	287	2
Superintendents and managers.....	611	595	16
Clerks.....	2,039	1,595	444
Wage earners (average number).....	44,046	35,796	8,250
16 years of age and over.....	43,002	35,057	7,945
Under 16 years of age.....	1,044	739	305

The average number of persons engaged in the industry during 1909 was 47,303, of whom 44,046, or 93.1 per cent, were wage earners; 1,218, or 2.6 per cent, proprietors and officials; and 2,039, or 4.3 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 81.6 per cent were males and 18.4 per cent females. Over nine-tenths (94.6 per cent) of the females were wage earners. Of the 1,044 children under 16 years of age employed as wage earners, 70.8 per cent were males and 29.2 per cent females.

The average number of wage earners employed in the industry in 1909, 1904, and 1899 is given for each state in Table 14. The distribution of the average number by sex and age is not shown for the individual states, but Table 15 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported from all of the 10 states shown in the table. The largest number, 2,222 was reported from Massachusetts, and the next largest number, 1,646, from New York.

In order to compare the distribution of the persons engaged in the industry in 1909 according the occupational status with that in 1904, it is necessary to use the classification employed at the earlier census.

(See Introduction.) Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE DYEING AND FINISHING OF TEXTILES.				Per cent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	47,303	100.0	38,071	100.0	24.2
Proprietors and firm members.....	318	0.7	310	0.8	2.6
Salaried employees.....	2,939	6.2	2,196	5.8	33.8
Wage earners (average number).....	44,046	93.1	35,565	93.4	23.8

Table 5 shows the average number of wage earners engaged in the industry, distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS ENGAGED IN THE DYEING AND FINISHING OF TEXTILES.					
	1909		1904		1899	
	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.
Total.....	44,046	100.0	35,565	100.0	29,776	100.0
16 years of age and over.....	43,002	97.6	34,141	96.0	28,672	96.3
Male.....	35,057	79.6	28,433	80.1	24,419	82.0
Female.....	7,945	18.0	5,668	15.9	4,253	14.3
Under 16 years of age.....	1,044	2.4	1,424	4.0	1,104	3.7

The absolute number of males and females 16 years of age and over increased during each of the two five-year periods covered by the table, but the number of children under 16 years of age, though larger in 1904 than in 1899, was less in 1909 than in either 1904 or 1899. The number of women employed as wage earners increased 86.8 per cent during the decade 1899-1909, and the proportion which they represented of the total number also increased appreciably. The proportion of males 16 years of age or over and of children under 16 years of age declined during the decade.

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during 1909 for each state in which an average of 500 or more wage earners were employed during the year, and for which statistics can be given without disclosing individual operations.

STATE.	WAGE EARNERS EMPLOYED IN THE DYEING AND FINISHING OF TEXTILES: 1909 ¹												
	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	44,046	43,715	44,299	44,863	44,635	43,840	43,405	43,212	43,447	44,171	44,031	44,737	44,157
Connecticut.....	1,719	1,720	1,716	1,754	1,768	1,738	1,735	1,700	1,688	1,679	1,704	1,701	1,730
Delaware.....	1,580	1,580	1,580	1,580	1,580	1,580	1,580	1,580	1,580	1,580	1,580	1,580	1,580
Maine.....	523	528	532	532	528	488	525	523	508	508	516	531	552
Massachusetts.....	9,079	8,932	8,964	9,206	9,039	9,012	9,113	9,152	9,116	9,278	8,778	9,235	9,125
New Hampshire.....	625	512	564	549	553	658	661	622	669	694	673	667	682
New Jersey.....	10,129	10,239	10,557	10,548	10,555	10,253	9,641	9,526	9,876	9,907	10,018	10,289	10,137
New York.....	5,252	5,312	5,408	5,516	5,378	5,175	5,188	5,157	4,955	5,461	5,571	5,230	4,632
Pennsylvania.....	6,086	6,122	6,005	6,138	6,132	6,026	5,994	5,954	5,990	5,970	6,075	6,250	6,378
Rhode Island.....	7,792	7,548	7,700	7,783	7,829	7,660	7,726	7,737	7,823	7,855	7,891	7,994	7,957

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners reported for any month of 1909 was 44,863 for March, and the smallest number, 43,212, for July, the minimum number being equal to 96.3 per cent of the maximum. In 1904 the maximum number, 37,072, was reported for December, and the minimum number, 33,793, equal to 91.2 per cent of the maximum, for August. The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for a larger number of states in Table 15.

Prevailing hours of labor.—In Table 7 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

STATE.	In establishments with prevailing hours—					
	Total.					
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.
United States	44,048	107	1,102	398	28,172	12,639
Connecticut	1,719			2	351	1,366
Delaware	1,580				1,580	
Maine	523					523
Massachusetts	9,079	8	119	58	8,009	542
New Hampshire	625				625	
New Jersey	10,129	4	33	60	6,194	2,968
New York	5,252	65	816	197	2,830	1,324
Pennsylvania	6,086	10	39	33	2,078	3,874
Rhode Island	7,792				6,334	1,438

Over nine-tenths (96.4 per cent) of the wage earners in the industry were employed in establishments where the prevailing number of hours was more than 54 per week. Almost two-thirds (64 per cent) of the total number worked in establishments where the prevailing

hours were between 54 and 60 per week, while somewhat more than one-fourth (28.7 per cent) were in establishments where they were 60 per week. In six of the states for which figures are given in the table, the most common working time was between 54 and 60 hours; in Connecticut, Maine, and Pennsylvania, however, the largest number of wage earners were employed in establishments where the prevailing hours were 60 per week. Only 3.7 per cent of the total number of wage earners in the industry were in establishments where the prevailing number of hours of employment per week exceeded 60, and only 3.6 per cent in establishments where it was as low as 54.

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of the dyeing and finishing establishments.

CHARACTER OF OWNERSHIP.	Value of products.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	428	360	\$33,556,432	\$50,849,545
Individual.....	123	110	5,502,602	4,760,339
Firm.....	89	187	5,805,379	4,411,722
Corporation.....	214	163	72,248,551	41,677,484
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	28.9	30.6	6.6	9.4
Firm.....	20.9	124.2	6.9	8.7
Corporation.....	50.2	45.3	86.5	82.0

¹ Includes two establishments under "other" ownership, to avoid disclosure of individual operations.

In 1909, of the total number of establishments reported, 50.2 per cent were under corporate ownership, as compared with 45.3 per cent in 1904; the value of the products of these establishments represented 86.5 per cent of the total value of products for all establishments engaged in the industry in 1909 and 82 per cent in 1904.

Table 9 gives statistics for establishments classified according to form of ownership in the five leading states.

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
Massachusetts.....	6	7	35	248	306	8,525	283,436	680,369	20,949,085	176,557	357,144	10,889,923
New Jersey.....	19	6	42	296	466	9,367	388,837	702,380	14,704,571	300,449	373,391	8,769,252
New York.....	31	16	34	422	334	4,498	1,119,383	1,837,907	6,715,938	627,868	684,967	4,221,132
Pennsylvania.....	48	50	37	859	1,160	4,067	1,432,593	2,056,104	8,570,600	880,980	1,250,886	4,587,744
Rhode Island.....	10	3	32	1,171	57	6,564	2,023,878	69,469	11,862,353	1,379,941	46,378	7,210,100

Of the total number of wage earners employed in the industry in 1909, 3,166, or 7.2 per cent, were employed in establishments under individual ownership;

2,483, or 5.6 per cent, in those under firm ownership; and 38,397, or 87.2 per cent, in those owned by corporations.

There was considerable variation among the states in the relative importance of the establishments operated by individuals, firms, and corporations, respectively. Thus, in Massachusetts, the leading state in the industry, establishments controlled by corporations constituted almost three-fourths of the total number of establishments, gave employment to 93.9 per cent of the wage earners, and reported 95.7 per cent of the total value of products. The proportions for Connecticut, where 8 out of 10 establishments were under corporate ownership, were very high also, but the percentages can not be given without disclosing individual operations. In Pennsylvania, on the other hand, corporations controlled only 27.4 per cent of the establishments, but these establishments gave employment to 66.8 per cent of the wage earners, and contributed 71.1 per cent of the total value of products.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for the establishments in the industry grouped according to the value of their products.

Of the 426 establishments reported for 1909, 20, or 4.7 per cent, reported products valued at \$1,000,000 or over. In 1904 there were 9 establishments of this class out of a total of 360. While such establishments represented an insignificant proportion of the total number at both censuses, they reported a considerable proportion of the total value of products—44.6 per cent in 1909 and 25.4 per cent in 1904. The increase in the value of products for this class of establishments represented 74.6 per cent of the total for the entire industry.

On the other hand, the small establishments—that is, those having products valued at less than \$20,000—constituted 29.8 per cent of the total number of establishments, but the value of their products represented only 1.4 per cent of the total. The great bulk of the value of products of the industry was reported by establishments having products valued at \$100,000 or over, such establishments reporting 89.4 per cent of the total value in 1909 and 84.9 per cent in 1904.

Table 10

VALUE OF PRODUCTS PER ESTABLISHMENT.	DYEING AND FINISHING TEXTILES.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	428	360	\$83,556,432	\$50,849,545
Less than \$5,000.....	38	28	109,788	83,441
\$5,000 and less than \$20,000.....	89	94	1,079,228	1,086,059
\$20,000 and less than \$100,000.....	165	137	7,663,519	6,518,795
\$100,000 and less than \$1,000,000..	114	92	37,395,345	30,256,218
\$1,000,000 and over.....	20	9	37,308,552	12,905,032
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	8.9	7.8	0.1	0.2
\$5,000 and less than \$20,000.....	20.9	26.1	1.3	2.1
\$20,000 and less than \$100,000.....	38.7	38.1	9.2	12.8
\$100,000 and less than \$1,000,000..	26.8	25.6	44.8	59.5
\$1,000,000 and over.....	4.7	2.5	44.6	25.4

During the five-year period from 1904 to 1909 the average value of products per establishment increased from \$141,249 to \$196,142, the average value added by manufacture, as computed from Table 1, from \$86,745 to \$113,369, and the average number of wage earners per establishment from 98.8 to 103.4.

Table 11 classifies the establishments in the industry by states, according to the number of wage earners employed.

Table 11

STATE.	DYEING AND FINISHING TEXTILES.																			
	Establishments employing in 1909—																			
	Total.		No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States...	428	44,046	4	78	240	126	1,631	80	2,602	47	3,109	41	6,675	23	8,056	21	13,896	6	7,837	
Connecticut.....	10	1,719	.....	1	2	3	50	3	127	.....	.....	.....	.....	1	256	2	1,284	.....	1	1,580
Delaware.....	1	1,580	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine.....	1	523	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts.....	48	9,079	1	3	10	8	84	7	225	6	357	12	1,999	5	1,733	5	3,576	1	1,095	.....
New Hampshire.....	2	625	.....	.....	.....	.....	.....	.....	.....	1	68	.....	.....	.....	.....	1	557	.....	.....	.....
New Jersey.....	67	10,129	.....	12	34	15	170	12	369	11	691	7	1,098	2	614	5	3,042	3	4,111	.....
New York.....	81	5,252	2	17	48	33	441	14	451	4	308	3	543	5	1,477	3	1,984	.....	.....	.....
Pennsylvania.....	135	6,086	.....	29	98	46	630	32	1,019	15	948	9	1,236	3	1,261	1	894	.....	.....	.....
Rhode Island.....	45	7,792	.....	7	25	10	149	6	211	4	343	8	1,515	6	2,462	3	2,036	1	1,051	.....

Of the 426 establishments reported, four employed no wage earners; 47.9 per cent employed from 1 to 20 wage earners; 29.8 per cent, from 21 to 100; 9.6 per cent, from 101 to 250; and 11.7 per cent, more than 250 wage earners. Of the 44,046 wage earners, 4.2 per cent were reported by the establishments employing from 1 to 20 wage earners; 13 per cent by those employing from 21 to 100; 15.2 per cent by those employing from 101 to 250; and 67.6 per cent

by those employing more than 250. Six establishments employed more than 1,000 wage earners, the number of wage earners in these establishments forming 17.8 per cent of the total for the industry.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for calculating profits. Facts of

interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total reported expenses in 1909 to have been \$68,647,853, distributed as follows: Cost of materials, \$35,261,301, or 51.4 per cent; wages, \$21,226,924, or 30.9 per cent; salaries, \$5,034,710, or 7.3 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$7,124,918, or 10.4 per cent. The variations in the proportions represented by the different classes of expenses in the several states which are shown in Table 15 are largely due to differences in the relative importance of the various classes of work covered by the industry designation (dyeing, bleaching, finishing, etc.), and to differences in the extent to which the work was done on purchased materials.

Engines and power.—Table 12 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the industry increased from 69,238 horsepower in 1899 to 107,746 horsepower in 1909, or 55.6 per cent. At each census steam power constituted the major part of the primary power employed in the industry, the proportion which it formed of the total increasing from 82.6 per cent in 1899 to 85.6 per cent in 1909. The amount of water-power increased only 640 horsepower, or 6.8 per cent from 1899 to 1909, while the proportion which it formed of the total primary power decreased from 13.7 per cent to 9.3 per cent. There was a considerable

increase in the horsepower of electric motors operated by purchased current (rented electric power). The number and horsepower of electric motors used for distributing power by means of current generated in the establishments in the industry show a very decided increase, the horsepower of such motors in 1909 amounting to 21,346, as compared with only 1,949 10 years earlier.

Table 12 DYEING AND FINISHING TEXTILES.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	2,181	1,663	1,623	107,746	84,868	69,238	100.0	100.0	100.0
Owned.....	1,990	1,621	1,623	103,605	81,396	68,322	96.2	95.9	98.7
Steam.....	1,893	1,533	1,535	92,284	70,385	57,216	85.6	82.9	82.6
Gas.....	20	10	2	1,207	711	8	1.1	0.8	(¹)
Water wheels.....	76	71	86	10,074	10,125	9,474	9.3	11.9	13.7
Water motors.....	1	7	(²)	40	5	(²)	(¹)	(¹)	(²)
Other.....					170	1,624		0.2	2.3
Rented.....	191	42	(²)	4,141	3,472	916	3.8	4.1	1.3
Electric.....	191	42	(²)	2,665	1,087	50	2.5	1.3	0.1
Other.....				1,476	2,385	866	1.4	2.8	1.2
Electric motors.....	1,418	498	131	24,011	11,724	1,999	100.0	100.0	100.0
Run by current generated by establishment.....	1,228	446	131	21,346	10,637	1,949	88.9	90.7	97.5
Run by rented power.....	191	42	(²)	2,665	1,087	50	11.1	9.3	2.5

¹ Less than one-tenth of 1 per cent.

² Not reported.

Table 13 shows for 1909 statistics as to the power and the fuel used in the industry in the six leading states.

Table 13 DYEING AND FINISHING TEXTILES.

STATE.	Number of establishments reporting.	Total horsepower.	Primary horsepower.					Electric horsepower.		Fuel used.							
			Owned by establishments reporting.					Rented.		Total, rented and generated in the establishment reporting.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States..	388	107,746	103,605	92,284	1,207	10,114		2,665	1,476	24,011	21,346	693,093	869,216	2,576	746	10,037	64,657
Connecticut.....	10	5,851	5,851	2,911	15	2,925				974	974	1,456	53,795		10	993	3,850
Massachusetts.....	46	24,513	23,956	21,466		2,490		370	187	7,524	7,154	106,083	171,315	2,016		1,143	46
New Jersey.....	61	19,989	19,521	18,965	16	540		401	67	3,607	3,206	304,610	109,535			1,640	39,122
New York.....	63	8,750	7,588	7,239	114	235		758	404	1,284	526	49,371	65,844	2	74	24	7,953
Pennsylvania.....	126	13,560	12,986	12,829	62	95		203	371	1,513	1,310	69,612	166,532			22	5,756
Rhode Island.....	44	21,179	20,987	18,131	1,000	1,856		75	117	6,248	6,173	57,061	192,327	140	685	6,213	7,443
All other states.....	38	13,904	12,716	10,743		1,973		858	330	2,861	2,003	5,000	109,868		27	2	487

The states which ranked highest with respect to the amount of power used were Massachusetts, Rhode Island, New Jersey, and Pennsylvania. The total horsepower reported for these states in 1909 was 79,241, or 73.5 per cent of the total for the United States. Steam was the most important form of power in all of the states shown in the table except Connecticut. The largest amount of steam power

was reported for Massachusetts, the largest amount of water power for Connecticut, and the largest amount of rented electric power for New York.

Fuel consumed.—Bituminous coal was the principal class of fuel used, 869,216 short tons being consumed in 1909. The largest quantity of anthracite coal, 304,610 long tons, or more than one-half of the total for the industry, was reported for New Jersey.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the dyeing and finishing of textiles are presented, by states, in Tables 14 and 15.

Table 14 shows for 1909, 1904, and 1899 the number of establishments, number of persons engaged in the

industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture. Table 15 gives the statistics of the industry for 1909 in somewhat greater detail.

DYEING AND FINISHING TEXTILES—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1909	426	47,303	318	2,939	44,048	107,748	\$114,093	\$5,035	\$21,227	\$35,261	\$83,556	\$48,295
	1904	360	38,071	310	2,196	35,555	84,868	88,709	3,407	15,469	19,621	50,850	31,229
	1899	298	31,394	300	1,318	29,778	69,238	60,643	2,267	12,728	17,958	44,963	27,005
Connecticut.....	1909	10	1,817	3	95	1,719	5,851	5,375	198	872	1,480	3,562	2,082
	1904	10	1,496	2	88	1,406	4,883	4,562	162	640	927	2,215	1,288
	1899	5	1,339	39	39	1,300	4,724	3,244	101	579	907	2,270	1,363
Illinois.....	1909	12	203	9	22	172	366	339	21	92	105	363	258
	1904	8	153	2	28	123	532	247	32	45	30	161	131
	1899	4	93	2	7	84	160	114	7	28	33	87	64
Massachusetts.....	1909	48	9,683	21	583	9,079	24,513	30,597	1,143	4,430	10,469	21,893	11,424
	1904	46	7,935	24	403	7,508	19,242	30,875	769	3,262	4,179	11,049	6,870
	1899	37	4,941	24	239	4,678	14,292	15,206	548	2,081	3,111	8,868	5,757
New Jersey.....	1909	67	10,722	32	561	10,129	19,989	23,315	1,033	5,016	6,353	15,796	9,443
	1904	57	8,180	31	552	7,597	12,835	13,069	847	3,466	5,052	11,980	6,928
	1899	59	7,474	47	353	7,074	12,335	11,601	615	3,003	4,514	10,489	5,975
New York.....	1909	81	5,782	68	462	5,252	8,750	11,259	765	2,321	4,139	9,673	5,534
	1904	55	3,850	60	204	3,586	7,128	7,530	258	1,578	1,339	4,362	3,023
	1899	42	3,274	50	107	3,117	5,885	6,231	134	1,425	1,402	3,626	2,224
North Carolina.....	1909	4	358	3	25	330	558	613	25	86	113	307	194
	1904	4	330	2	27	301	705	829	28	83	86	251	165
	1899	5	197	5	8	184	345	294	7	45	95	176	81
Pennsylvania.....	1909	135	6,688	155	447	6,086	13,560	13,242	598	2,988	5,331	12,059	6,728
	1904	123	5,070	161	324	4,585	9,712	9,923	445	2,075	2,701	6,786	4,085
	1899	105	5,087	155	216	4,716	10,100	7,680	260	2,066	3,175	7,038	3,863
Rhode Island.....	1909	45	8,405	16	597	7,792	21,179	21,926	981	3,616	5,319	13,956	8,637
	1904	37	7,984	19	403	7,562	18,705	16,970	672	3,182	3,639	9,981	6,342
	1899	24	6,204	6	256	5,942	14,820	12,853	450	2,474	3,088	8,485	5,397
All other states.....	1909	24	3,645	11	147	3,487	12,962	7,427	271	1,806	1,952	5,947	3,995
	1904	20	3,073	9	167	2,897	11,126	4,704	204	1,137	1,568	4,065	2,397
	1899	17	2,785	11	93	2,681	5,578	3,420	145	1,025	1,633	3,924	2,291

MANUFACTURES.

DYEING AND FINISHING TEXTILES—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.								WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.	
								Maximum month.	Minimum month.						
United States..	426	47,303	318	900	1,595	444	44,048	Mh 44,863	Jy 43,212	45,841	38,488	8,268	768	317	107,746
Connecticut.....	10	1,817	3	36	46	13	1,719	Ap 1,768	Se 1,679	1,730	1,474	211	33	12	5,851
Illinois.....	12	203	9	8	2	12	172	My 178	Ja 162	174	134	40	.....	.....	386
Maryland.....	3	85	1	3	.....	.....	79	Fe ¹ 86	Se ¹ 72	80	59	18	.....	3	93
Massachusetts.....	48	9,683	21	142	354	87	9,079	Se 9,278	Oc 8,778	10,053	7,600	2,060	231	162	24,513
New Jersey.....	67	10,722	32	162	340	59	10,129	Fe 10,557	Jy 9,526	10,186	8,718	1,361	75	32	19,989
New York.....	81	5,782	68	131	247	84	5,252	Oc 5,571	De 4,682	5,553	3,883	1,640	24	6	8,750
North Carolina.....	4	358	3	10	10	5	330	De 366	Oc 293	366	244	98	12	12	556
Ohio.....	6	206	1	5	12	4	184	Ap 218	Ja 169	176	150	26	.....	.....	4,578
Pennsylvania.....	135	6,688	155	156	216	75	6,086	De 6,376	Jy 5,954	6,222	5,230	753	202	37	13,560
Rhode Island.....	45	8,405	16	196	313	88	7,792	No 7,994	Ja 7,548	7,961	6,186	1,585	144	46	21,179
All other states ²	15	3,354	9	51	53	17	3,224	.....	.....	3,340	2,808	477	48	7	8,291

STATE.	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States..	\$114,092,654	\$68,647,853	\$3,007,431	\$2,027,279	\$21,226,924	\$4,461,077	\$30,810,224	\$282,090	\$565,126	\$337,422	\$5,940,280	\$83,556,432	\$48,295,131
Connecticut.....	5,375,233	2,828,323	122,880	75,404	872,202	199,458	1,280,610	1,000	32,326	.....	244,443	3,561,927	2,081,859
Illinois.....	339,036	250,067	11,090	9,698	91,961	13,816	91,668	7,520	1,333	800	22,181	362,787	257,303
Maryland.....	109,268	113,569	5,900	910	31,583	5,041	55,544	.....	791	.....	13,800	126,570	65,985
Massachusetts.....	30,597,076	18,010,736	625,038	517,833	4,429,973	997,417	9,471,849	11,041	209,184	10,453	1,737,893	21,892,890	11,423,624
New Jersey.....	23,314,817	13,518,868	639,264	393,846	5,015,561	980,052	5,372,644	47,709	70,473	.....	999,319	15,795,788	9,442,092
New York.....	11,258,953	8,248,384	489,897	274,814	2,321,016	409,069	3,730,192	99,203	55,483	320,232	548,478	9,673,228	5,533,967
North Carolina.....	612,655	246,102	18,200	6,922	85,859	14,284	98,242	.....	2,967	496	19,132	306,853	194,327
Ohio.....	692,580	406,581	16,500	10,627	94,361	23,849	218,927	1,628	3,447	.....	37,242	423,144	180,368
Pennsylvania.....	13,241,764	10,079,920	356,531	241,374	2,988,496	650,393	4,680,294	70,035	51,199	2,741	1,038,857	12,059,297	6,728,610
Rhode Island.....	21,926,333	10,804,221	565,302	416,157	3,616,496	852,376	4,466,905	11,836	92,688	2,700	779,761	13,955,700	8,636,419
All other states ²	6,624,939	4,141,082	156,829	79,644	1,679,411	305,322	1,343,349	32,118	45,235	.....	499,174	5,398,248	3,749,577

¹ Same number reported for one or more other months.
² "All other states" embrace: Alabama, 1 establishment; Delaware, 1; Indiana, 2; Iowa 1; Kentucky, 2; Maine, 1; Michigan, 1; Missouri, 1; New Hampshire, 2; Oregon, 1; South Carolina, 1; West Virginia, 1.

OILCLOTH AND LINOLEUM

THE OILCLOTH AND LINOLEUM INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—This industry embraces establishments engaged primarily in the manufacture of floor coverings of oilcloth and linoleum (including cork carpet) and of enameled oilcloth, including table, shelf, and upholsters' oilcloth, etc. Some of the establishments in the industry also manufacture buckram and burlap wall coverings, which are included under "all other products" in Table 9. Establishments which manufacture opaque window shade cloth, however, are not included. The report also takes cognizance of establishments manufacturing artificial leather (included with "upholstering materials" in 1909), to the extent of including in Table 9, but not elsewhere, statistics of the quantity and value of this product, which is closely allied to oilcloth and linoleum in composition.

In reports of previous censuses the statistics for the industry have been published separately under two classifications, "oilcloth, enameled," and "oilcloth and linoleum, floor," but at the present census, because of the overlapping of the statistics, the two classifications have been combined under the designation "oilcloth and linoleum."

Summary for the two branches of the industry.—Table 1 presents statistics for the oilcloth and linoleum

industry as a whole and for its two branches separately for 1909.

ESTABLISHMENTS MANUFACTURING PRIMARILY—	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
Total	31	5,201	\$2,325,545	\$15,550,101	\$23,339,022	\$7,788,921
Oilcloth and linoleum, floor.....	19	4,225	2,309,404	10,145,316	15,813,331	5,668,015
Oilcloth, enameled.....	12	976	516,141	5,404,785	7,525,691	2,120,906

The oilcloth and linoleum branch of the industry contributed 67.8 per cent of the total value of products reported for the industry as a whole and 72.7 per cent of the value added by manufacture. Of the total number of wage earners, 81.2 per cent were reported by the floor oilcloth and linoleum branch.

Comparison with earlier censuses.—Table 2 summarizes the statistics for the manufacture of oilcloth and linoleum as reported at each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	31	27	27	28	29	34	14.8	14.8	.....	-3.6	-3.4	-14.7
Persons engaged in the industry.....	5,557	4,112	3,409	(2)	(2)	(2)	63.0	35.1	20.6	.....	.....	.....
Proprietors and firm members.....	11	12	26	(2)	(2)	(2)	-57.7	-8.3	-53.8	.....	.....	.....
Salaried employees.....	345	217	153	(2)	(2)	(2)	125.5	59.0	41.8	.....	.....	.....
Wage earners (average number).....	5,201	3,885	3,230	1,862	1,993	1,411	61.0	33.9	20.2	73.5	(3)	(3)
Primary horsepower.....	16,125	10,112	7,561	2,669	(2)	424	113.3	59.5	33.7	183.3	.....	.....
Capital.....	\$19,634,138	\$13,803,232	\$8,879,102	\$4,477,256	\$3,744,550	\$2,237,000	121.1	42.2	55.5	98.3	19.6	67.4
Expenses.....	20,960,264	13,724,541	9,994,265	4,676,936	(2)	(2)	108.7	52.0	37.3	113.7	.....	.....
Services.....	3,474,623	2,304,987	1,922,636	1,050,430	849,862	687,288	80.7	50.7	19.9	83.0	23.6	23.7
Salaries.....	649,083	361,230	294,523	(2)	(2)	(2)	120.4	79.7	22.6	.....	.....	.....
Wages.....	2,825,545	1,943,757	1,628,113	(2)	(2)	(2)	73.5	45.4	19.4	.....	.....	.....
Materials.....	15,550,101	10,050,009	7,549,672	3,363,813	3,982,908	2,548,768	106.0	54.7	33.1	124.4	-15.5	56.3
Miscellaneous.....	1,835,535	1,369,545	521,957	262,693	(2)	(2)	251.7	34.0	162.4	98.7	.....	.....
Value of products.....	23,339,022	14,792,246	11,402,620	5,481,087	5,814,587	4,211,579	104.7	57.8	29.7	108.0	-5.7	38.1
Value added by manufacture (value of products less cost of materials).....	7,788,921	4,742,237	3,852,948	2,117,274	1,831,679	1,662,811	102.2	64.2	23.1	82.0	15.6	10.2

¹ A minus sign (-) denotes decrease. Where percentages are omitted comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The manufacture of oilcloth in the United States commenced about 1807. Statistics for the industry first appeared in the census reports for 1810, when 1 establishment in Philadelphia was reported as engaged in "floor cloth stamping." Its product was given as 1,500 yards, valued at \$3,000. At the census of 1849, 56 establishments were reported, with 650 wage earners and products valued at \$1,256,994.

The census of 1859 showed 49 establishments, with 1,538 wage earners and products valued at \$3,602,216.

The industry has shown continuous and substantial increases for the entire period covered by Table 2, with the single exception of the decade 1879-1889, when slight decreases appeared in several of the principal items shown. The value of products for 1909 was more than five times that in 1869, and the

number of wage earners increased 268.6 per cent between those years. The value of products and cost of materials more than doubled during the decade 1899-1909, the percentage of increase in each case being slightly less than during the preceding decade. The number of wage earners increased 61 per cent and the amount paid in wages 73.5 per cent from 1899 to 1909. Salaried employees were included to some extent with wage earners at the earlier censuses, and comparative figures for this class, therefore, are not shown for censuses prior to that of 1899.

The value of products of establishments engaged in manufacturing oilcloth and linoleum in 1909 was \$23,339,022, two-thirds of which (\$15,550,101) represented the cost of materials. The value added by manufacture (value of products less cost of materials) was, therefore, \$7,788,921.

Summary, by states.—Detailed statistics for 1909 are given for each state in the industry in Table 11, so far as figures can be presented without disclosing individual operations. New Jersey was the leading state in the industry in 1909, reporting 40.8 per cent of the total number of wage earners and 43.5 per cent of the total value of products. Pennsylvania ranked second in value of products; figures for this state can not be given, however, without disclosing individual operations. New York ranked third in value of products in 1909, reporting 15.1 per cent of the total value of products and 21.2 per cent of the total number of wage earners.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.		
	Total.	Male.	Female.
All classes	5,557	5,345	212
Proprietors and officials	111	110	1
Proprietors and firm members.....	11	10	1
Salaried officers of corporations.....	48	48	.....
Superintendents and managers.....	52	52	.....
Clerks.....	245	191	54
Wage earners (average number).....	5,201	5,044	157
16 years of age and over.....	5,154	4,997	157
Under 16 years.....	47	47	.....

The average number of persons engaged in the industry during 1909 was 5,557, of whom 93.6 per cent were wage earners, 2 per cent proprietors and officials, and 4.4 per cent clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 5,345, or 96.2 per cent, were males. The number of children reported as wage earners was only 47.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904 it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				Per cent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	5,557	100.0	4,112	100.0	35.1
Proprietors and firm members.....	11	0.2	12	0.3	.....
Salaried employees.....	345	6.2	217	5.3	59.0
Wage earners (average number).....	5,201	93.6	3,883	94.4	33.9

Wage earners employed, by months.—Table 5 gives the number of wage earners employed in the oilcloth and linoleum industry on the 15th (or nearest representative day) of each month during the year 1909.

MONTH.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	5,083	93.5
February.....	5,110	94.0
March.....	5,100	93.8
April.....	5,057	93.0
May.....	5,133	94.4
June.....	5,158	94.9
July.....	5,169	95.1
August.....	5,221	96.1
September.....	5,282	97.2
October.....	5,351	98.5
November.....	5,321	97.9
December.....	5,435	100.0

In the industry as a whole the largest number of wage earners employed during any month of 1909 was 5,435 in December, and the smallest number, 5,057, in April, the minimum number being equal to 93 per cent of the maximum. In 1904 the maximum number, 3,953, was shown for August, and the minimum number, 3,780, for November, the minimum number being equal to 95.6 per cent of the former.

Prevailing hours of labor.—In Table 6 the wage earners in the oilcloth and linoleum industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

PREVAILING HOURS OF LABOR PER WEEK.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Average number.	Per cent of total.
Total.....	5,201	100.0
48 and under.....	14	0.3
Between 48 and 54.....	16	0.3
54.....	370	7.1
Between 54 and 60.....	2,074	39.9
60.....	2,727	52.4

Of the 5,201 wage earners reported for 1909, 2,727, or 52.4 per cent, were employed in establishments where the prevailing hours of labor were 60 per week; 2,074, or 39.9 per cent, in establishments where the prevailing hours were between 54 and 60 per week; and 400, or 7.7 per cent, in establishments where the prevailing hours were 54 or less than 54 per week.

Character of ownership.—Table 7 presents statistics with respect to the character of ownership of the establishments engaged in the oilcloth and linoleum industry.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	31	27	\$23,339,022	\$14,792,246
Individual.....	2	3	.....	135,150
Firm.....	3	3	1,906,044	1,082,489
Corporation.....	26	21	22,432,978	13,574,607
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	6.5	11.1	.....	0.9
Firm.....	9.7	11.1	13.9	7.3
Corporation.....	83.9	77.8	96.1	91.8

¹ Includes two establishments under individual ownership, to avoid disclosure of individual operations.

² Includes one establishment under firm ownership, to avoid disclosure of individual operations.

Establishments under corporate ownership increased both absolutely and relatively in number and in value of products during the five-year period 1904 to 1909.

Size of establishments.—The average size of the establishments in this industry, as measured by value of products, is larger than in most other industries. Eight establishments reported a value of products in excess of \$1,000,000; nineteen, a value of products of \$100,000 but less than \$1,000,000; and four a value of products of \$20,000 but less than \$100,000. The average value of products per establishment, as computed from figures in Table 2, increased from \$422,319 in 1899 to \$752,872 in 1909, and the value added by manufacture advanced from \$142,702 to \$251,256 during the same period. The average number of wage earners per establishment increased from 119.6 in 1899 to 168 in 1909.

Expenses.—As stated in the Introduction, the census statistics representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 2 shows the total expenses in the oilcloth and linoleum industry in 1909 to have been \$20,860,264, distributed as fol-

lows: Cost of materials, \$15,550,101, or 74.5 per cent; wages, \$2,825,545, or 13.5 per cent; salaries, \$649,083, or 3.1 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$1,835,535, or 8.8 per cent. There were considerable variations in the proportions of the total reported expenses represented by the various classes in the several states, due largely to differences in the grades of oilcloth and linoleum manufactured. In the four principal states in the industry, as shown in Table 11, the cost of materials ranged from 82 per cent of the total expenses in Massachusetts to 69.8 per cent in New York.

Engines and power.—The amount of power used in the industry was first reported at the census of 1869. Table 2 shows that the total power used increased from 424 horsepower in 1869 to 16,125 in 1909. Table 8 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	223	156	117	16,125	10,112	7,561	100.0	100.0	100.0
Owned.....	175	148	117	15,048	9,984	7,561	93.3	98.7	100.0
Steam.....	174	146	117	15,046	9,831	7,461	93.3	97.2	98.7
Gas.....	1	2	(¹)	2	47	(¹)	(²)	0.5	.....
Other.....	.....	.....	.....	.....	106	100	.....	1.0	1.3
Rented.....	48	8	(¹)	1,077	128	(¹)	6.7	1.3	.....
Electric.....	48	8	(¹)	1,002	93	(¹)	6.2	0.9	.....
Other.....	.....	.....	.....	75	35	.....	0.5	0.3	.....
Electric motors.	336	125	75	4,540	1,275	718	100.0	100.0	100.0
Run by current generated by establishment.....	288	117	75	3,538	1,182	718	77.9	92.7	100.0
Run by rented power.....	48	8	(¹)	1,002	93	(¹)	22.1	7.3	.....

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power used in the oilcloth and linoleum industry increased from 7,561 horsepower in 1899 to 16,125 horsepower in 1909, or 113.3 per cent. Steam power formed the major part of the primary power employed in the industry, though the proportion which it formed of the total primary power decreased from 98.7 per cent in 1899 to 93.3 per cent in 1909. Rented electric power increased from 93 horsepower in 1904 to 1,002 horsepower in 1909. This class of power was not reported for the industry in 1899. The horsepower of electric motors run by current generated in the establishments in the industry was nearly five times as great in 1909 as in 1899.

SPECIAL STATISTICS RELATING TO PRODUCTS.

Summary for the United States.—Table 9 shows the quantity and value of the different kinds of oilcloth and linoleum manufactured in 1909 and 1904 by establishments in the industry, and also the quantity and value of the artificial leather produced in 1909.

PRODUCT.	1909	1904
Total value.....	¹ \$26,253,796	\$14,792,246
Oilcloth.....	\$11,681,012	\$8,648,337
Floor—		
Square yards.....	18,354,851	21,456,615
Value.....	\$3,776,660	\$3,565,689
Enameled—		
Square yards.....	17,338,440	11,574,986
Value.....	\$2,265,146	\$1,542,467
Table—		
Square yards.....	61,168,777	38,026,083
Value.....	\$5,639,206	\$3,540,181
Linoleum.....	\$10,844,928	\$5,328,800
Linoleum, including cork carpet—		
Square yards.....	26,215,979	14,765,284
Value.....	\$7,850,437	\$4,223,992
Inlaid linoleum—		
Square yards.....	4,460,275	2,126,178
Value.....	\$2,994,491	\$1,104,808
Artificial leather:		
Square yards.....	11,869,875	(²)
Value.....	\$3,448,617	(²)
All other products.....	\$279,239	\$815,109

¹ In addition, products to the value of \$33,328 were reported by establishments engaged primarily in the manufacture of products other than those covered by the industry designation. The production of artificial leather is included under "upholstering materials" in the general reports.

² Figures not available.

Each of the varieties of oilcloth and linoleum shows a considerable percentage of increase in quantity and value except floor oilcloth, the output of which decreased 14.5 per cent in quantity, although its value increased 5.9 per cent. The decrease in the output of floor oilcloth is explained by the increased degree to which linoleum has been substituted for it as a floor covering. Inlaid linoleum shows the largest percentages of gain of any of the products of the industry during the five-year period, 109.8 per cent in output and 171 per cent in value. The output of table oilcloth, the most important of the oilcloth products in 1909, increased 60.9 per cent and its value 59.3 per cent between 1904 and 1909.

Floor oilcloth, which was the principal kind of oilcloth manufactured in 1904, representing 41.2 per cent of the total value of oilcloth produced, contributed only 32.3 per cent of the total value in 1909. The proportion of the total value represented by table oilcloth, on the other hand, increased from 40.9 per cent in 1904 to 48.3 per cent in 1909, and the proportion represented by enameled oilcloth from 17.8 per cent in the earlier year to 19.4 per cent in the later year.

In 1909 the value of linoleum represented 48.1 per cent of the total value of the combined value of oilcloth and linoleum, as compared with 38.1 per cent in 1904. "Linoleum, including cork carpet," represented 72.4 per cent of the total value of linoleum produced in 1909, as compared with 79.3 per cent in 1904.

The manufacture of artificial leather is so closely allied to the oilcloth industry that the quantity and value of this product has been included for 1909 in the preceding table. The total value of products as shown in Table 9 is not comparable with the total for 1904, since the value of artificial leather was not included at the former census. Artificial leather, although used to some extent in bookbinding, is used principally in the upholstering trade, and the reports for the manufacture of this product were included with those for the industry designated "upholstering materials" in the general census reports of 1909.

A detailed statement of the different products can not be given for any individual state except New Jersey without disclosing the operations of individual establishments. New Jersey was the leading state in the industry both in 1909 and 1904. The total value of products of the oilcloth and linoleum industry, including artificial leather, for this state in 1909 was \$11,519,680, which constituted 43.9 per cent of the total value for the United States. Linoleum represented more than half (57.5 per cent) of the total value of the products of the industry for the state, its value, \$5,834,338, being 53.8 per cent of the total value of linoleum for the United States. Of the total value of the different varieties of linoleum manufactured by the establishments in New Jersey in 1909, inlaid linoleum constituted 22.5 per cent and "linoleum, including cork carpet," 77.5 per cent. The proportion which the value of the different varieties of oilcloth constituted of the total value of oilcloth produced in the state was as follows: Floor oilcloth, 34.4 per cent; enameled oilcloth, 28.2 per cent; and table oilcloth, 37.4 per cent. The value of artificial leather manufactured in New Jersey in 1909 was \$1,377,084, or 39.9 per cent of the total for the United States.

Exports and imports.—Table 10 gives the amount and value of the imports and the value of the exports of oilcloth and linoleum from 1898 to 1910, inclusive, as compiled from the reports of the Bureau of Foreign and Domestic Commerce, Department of Commerce.

YEAR ENDING JUNE 30--	IMPORTS.		Exports (value).
	Square yards.	Value.	
1910.....	4,848,615	\$1,834,640	\$482,086
1909.....	5,306,329	1,894,810	359,764
1908.....	6,114,568	2,102,313	359,801
1907.....	7,109,067	2,313,772	353,808
1906.....	5,470,460	1,744,539	286,577
1905.....	3,508,855	1,220,372	269,929
1904.....	3,381,634	1,201,070	231,297
1903.....	3,358,655	1,105,894	221,417
1902.....	1,824,579	681,464	189,291
1901.....	1,306,222	532,255	172,635
1900.....	832,405	407,008	141,917
1899.....	416,658	216,210	132,532
1898.....	(¹)	(¹)	118,641

¹ Not reported separately prior to 1899.

The statistics of imports and exports in the reports of the Bureau of Foreign and Domestic Commerce do not make a clear distinction between cotton oilcloth and other cotton cloths; therefore, only the imports of floor oilcloth and linoleum are included in Table 10. The exports, however, include the statistics for all classes of oilcloth.

In 1899 the imports of oilcloth and linoleum amounted to only 416,658 square yards, valued at

\$216,210, but increased steadily from year to year until 1907, when 7,109,067 square yards, valued at \$2,313,772, were reported. From 1907 to 1910 the imports decreased to 4,848,615 square yards, valued at \$1,834,640.

The value of the exports of oilcloths has also increased with each successive year, with the single exception that there was a decrease in 1909 as compared with 1908.

DETAILED STATE TABLE.

The principal statistics secured by the census concerning the oilcloth and linoleum industry are presented, by states, in Table 11, which gives detailed statistics for 1909 concerning the number of establish-

ments, number of persons engaged in the industry, wage earners on December 15, or the nearest representative day, primary horsepower, capital, expenses, value of products, and value added by manufacture.

OILCLOTH AND LINOLEUM—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.
								Maximum month.	Minimum month.						
United States...	31	5,557	11	100	191	54	6,201	De 5,435	Ap 5,057	5,541	5,324	167	50	16,125	
Massachusetts.....	3	239	.....	8	8	3	220	Ap ¹ 224	Ja 211	226	186	40	.....	375
Michigan.....	3	59	.....	8	10	2	39	Au 42	Ap ¹ 37	41	41	.....	.....	210
New Jersey.....	10	2,264	6	32	73	30	2,123	Oc 2,230	Ap 2,035	2,294	2,247	16	31	7,819	
New York.....	4	1,153	2	15	28	6	1,102	De 1,173	Au 1,037	1,173	1,070	103	.....	2,384
All other states ²	11	1,842	3	37	72	13	1,717	.....	.....	1,807	1,780	8	19	5,337

STATE.	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States...	\$19,634,138	\$20,860,264	\$380,585	\$268,498	\$2,825,545	\$525,740	\$15,024,361	\$5,772	\$68,677	\$27,645	\$1,733,441	\$23,339,022	\$7,788,921
Massachusetts.....	688,617	1,478,153	29,598	12,816	117,764	12,573	1,197,947	2,760	4,942	.....	97,753	1,704,470	493,950
Michigan.....	137,418	227,289	14,400	6,255	26,133	4,720	156,025	1,800	1,100	.....	16,856	256,159	95,414
New Jersey.....	8,109,744	8,839,919	96,003	97,334	1,187,248	237,217	6,400,777	.....	32,650	4,207	784,483	10,142,596	3,504,602
New York.....	2,901,569	3,104,373	71,114	42,316	570,630	83,430	2,082,131	.....	11,899	.....	242,853	3,521,689	1,356,123
All other states ²	7,796,790	7,212,530	169,470	109,777	923,770	187,800	5,187,481	1,212	18,086	23,438	591,496	7,714,108	2,338,827

¹ Same number reported for one or more other months.

² All other states embrace: Illinois, 1 establishment; Indiana, 1; Maine, 2; Minnesota, 1; Ohio, 3; Pennsylvania, 3.

IRON AND STEEL

THE BLAST FURNACE, STEEL WORKS AND ROLLING MILL, WIRE, AND TIN-PLATE AND TERNEPLATE INDUSTRIES.

PART I.—THE GROUP AS A WHOLE.

Relationship of the Industries.—The present report embraces statistics for four classes of establishments—namely, blast furnaces, steel works and rolling mills, wire-drawing establishments, and tin-plate and terneplate dipping establishments—which are treated by the Census Bureau as belonging to separate industries. These industries are considered together because of their intimate relation to one another. The blast furnaces supply material for the steel works and rolling mills, and these in turn furnish the material for the tin-plate and wire industries. In fact, two or more different branches of manufacture are frequently carried on in establishments under the same ownership and in the same plant.

The fact that two or more of these industries are frequently conducted in a single plant renders the presentation of separate statistics for the industries very difficult. In order to bring out as clearly as possible the relative importance of the different industries, the Census Bureau has secured separate reports for the blast furnaces and for the tin-plate and terneplate dipping business, even when these are associated with steel works and rolling mills. It was found impossible to make a complete segregation of the statistics for the wire departments of steel works and rolling mills.

To state the matter somewhat more in detail, the bulk of the pig iron produced by the blast furnaces of the country is converted into steel and the steel fabricated into rolled forms in the same industrial plant, although, of course, there are some concerns which operate only blast furnaces and some which operate only steel works and rolling mills. Where the two branches of business are combined, separate reports are secured for the blast-furnace department, on the one hand, and the steel-works and rolling-mill department on the other hand. Each department is called an "establishment." A transfer value is assigned to the pig iron delivered to the steel works, and this transfer value appears as part of the value of products of the blast-furnace "establishment" and as part of the cost of materials of the steel-works and rolling-mill "establishment."

Again, the bulk of the business of dipping tin plate and terneplate is conducted in departments of rolling mills which produce the black plates, there being comparatively few independent dipping establishments which buy their black plates. Nevertheless, the dipping departments of rolling mills are treated as separate establishments by the Census Bureau. The sta-

tistics for the black-plate rolling mills, exclusive of the dipping departments, are included with the general statistics for steel works and rolling mills, although in the special report on the tin-plate and terneplate industry separate statistics for black-plate mills are also presented. The black plates transferred to the dipping departments are assigned a value which appears as part of the value of products of the rolling-mill industry and in turn as part of the cost of materials of the tin-plate industry.

Finally, a very considerable proportion of the wire produced in the country is drawn in the wire departments of iron and steel rolling mills and of brass and copper rolling mills, the latter mills being assigned to the industry "brass and bronze products." The rolling mills produce the wire rods and turn them over to the wire departments for drawing. It was found impossible, however, to segregate the statistics in detail for the wire departments of rolling mills; consequently, in most tables of the census reports the statistics given for the "wire" industry represent only the business of wire-drawing establishments which purchase the wire rods, and therefore by no means fully cover the wire industry in the broad and true sense. In Part V—the section devoted to the wire industry—in this report, however, such statistics as are available regarding the wire industry as a whole are presented. In the statistics for steel works and rolling mills the entire value of the wire and wire products made by such mills appears as part of the value of products of the industry.

Duplication in value of products and cost of materials.—It is evident from what has been said that to add together the values of products as shown for the blast-furnace industry, the steel works and rolling mills, the wire industry, and the tin-plate and terneplate dipping industry would give a total having no particular significance, because of the great duplication due to the use of the products of one establishment as materials for another establishment in the group. It may be noted that there is not only duplication as among the four industries distinguished by the Census Bureau, but also considerable duplication within the single industry designated as "steel works and rolling mills."

The following table shows at least approximately the extent of the duplication in the value of products, and the net value of the products of the four industries combined, exclusive of such duplication. Although for convenience in calculation the amount of duplication is given in exact figures, it should not be understood that

these figures are absolutely complete and correct. The last column shows the approximate value of the products of each industry which were produced for sale to establishments outside of this group of four industries. For example, the blast furnaces turned out in 1909 products (practically all pig iron) valued at \$391,429,283. Of this total, however, products to the value of over \$297,000,000 were for consumption in the steel works and rolling mills, while nearly \$94,000,000 worth of products of the blast furnaces were for use in other industries, the foundry and machine-shop industry being the most important consumer.

INDUSTRY.	Number of establishments.	Gross value of products.	Value of products used by establishments within this industry group.		Value of products not used by establishments within this industry group.
			By establishments owned or controlled by same company (interplant transfer).	By establishments not owned or controlled by same company (purchase).	
Total	741	\$1,509,607,980	\$329,320,478	\$181,217,703	\$999,069,801
Blast furnaces.....	208	391,429,283	228,250,824	69,220,298	93,958,161
Steel works and rolling mills.....	446	985,722,534	101,069,652	111,997,405	772,665,477
Wire mills (using purchased rods only).....	56	84,486,513	.....	.....	84,486,518
Tin-plate and terneplate dipping establishments.....	31	47,969,645	.....	.....	47,969,645

The net value of the products of this group of four industries in 1909 was in the neighborhood of a billion dollars. This is not to be confused with the value added to materials by manufacture—that is, the value of products less the cost of all materials—which for the four industries combined amounted to \$429,036,870.

The last column in the above table should not, of course, be taken as indicating at all the relative importance of the four branches of industry; nor, on the other hand, can the column showing gross value of products be taken as indicating such relative importance. The only available statistics tending to show the relative importance of the four industries are those of the average number of wage earners and of the value added to materials by manufacture. Such statistics are presented in Table 2.

PART II.—BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED.

The United States as a whole.—Because of the fact that a very large proportion of the output of pig iron is produced in blast furnaces operated in immediate conjunction with steel works, it has been the custom of the Census Bureau for several censuses past to present combined statistics for the two branches of industry. In the case of such a combination of statistics, however, the aggregate value of products, as well as the aggregate cost of materials, obtained by adding

It will be seen from this table that the number of wage earners employed in the blast furnaces is very much less than the number employed in the steel works and rolling mills, and also that very much less value is added to materials by manufacture in the former industry than in the latter. Immensely important as is pig iron in the iron and steel industry, the greater part of the value of pig iron is not produced by blast furnaces but is represented by the ore and fuel. So, too, the tin-plate plants perform relatively simple processes upon the materials which they obtain from the rolling mills, so that the number of wage earners and the value added to materials by manufacture for this industry is small in proportion to the value of the output. The same is true in somewhat less degree of the wire mills using purchased rods.

INDUSTRY.	Wage earners (average number).		Value added to materials by manufacture.	
	Number.	Per cent of total.	Amount.	Per cent of total.
Blast furnaces.....	38,429	12.7	70,791,394	16.5
Steel works and rolling mill.....	240,076	79.5	328,221,678	76.5
Wire mills (using purchased rods only).....	18,084	6.0	23,943,587	5.6
Tin-plate and terneplate dipping establishments.....	5,352	1.8	6,080,211	1.4

Unit of measure.—In all statements of tonnage relating to blast furnaces and steel works and rolling mills the ton of 2,240 pounds is used except where otherwise stated. On the other hand, the ton of 2,000 pounds is used in expressing the quantities for the wire industry.

Number of industrial plants in the four industries.—By reason of the fact that the Census Bureau treats some plants as consisting of two or more establishments, the total number of establishments reported in 1909, for the four industries under consideration, 741, is considerably greater than the actual number of separate plants, which was 657. Of the 208 blast-furnace “establishments” shown, 57 were operated in connection with steel works; and of the 31 tin-plate and terneplate “establishments,” 27 were departments of rolling mills.

the figures for all establishments involves so much duplication as to have little significance. It is possible to determine approximately the amount of these duplications for the later censuses but not for the earlier. On the other hand, the statistics as to persons engaged in the industries, horsepower, capital, and expenses other than cost of materials, as well as those relating to value added to materials by manufacture, can, of course, properly be combined. Such

statistics for the two industries combined, for the censuses from 1869 to 1909, are presented in Table 3. It may be noted that for 1869 the statistics include both active and idle establishments, but for the later

censuses only active establishments, and also that the financial figures for 1869 are given in currency, which at that time was worth only about 80 cents gold to the dollar.

Table 3

	BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904 ²	1899 ²	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	654	605	668	719	792	³ 808	-2.1	8.1	-9.4	-7.1	-9.2	-2.0
Persons engaged in the industry.....	303,823	259,291	231,871	(⁴)	(⁴)	(⁴)	31.0	17.2	11.8			
Proprietors and firm members.....	95	90	170	(⁴)	(⁴)	(⁴)	-44.1	5.6	-47.1			
Salaried employees.....	25,223	16,561	9,211	(⁴)	(⁴)	(⁴)	173.8	52.3	79.8			
Wage earners (average number).....	278,505	242,640	222,490	171,181	⁵ 140,798	⁶ 77,555	25.2	14.8	9.1	30.0	(⁶)	(⁶)
Primary horsepower.....	3,274,400	2,422,577	1,598,073	784,358	(⁴)	(⁴)	104.9	35.2	51.6	103.5		
Capital.....	\$1,492,315,770	\$936,327,839	\$573,391,663	\$405,771,786	\$209,904,965	\$121,772,074	160.3	54.9	63.3	41.3	93.3	72.4
Services.....	\$220,523,364	\$162,177,898	\$132,559,764	(⁴)	(⁴)	(⁴)	66.4	36.0	22.3			
Salaries.....	\$32,716,076	\$20,751,392	\$11,737,488	(⁴)	(⁴)	(⁴)	178.7	57.7	76.8			
Wages.....	\$187,807,288	\$141,426,506	\$120,820,276	(⁴)	(⁴)	(⁴)	55.4	32.8	17.1			
Miscellaneous expenses.....	\$53,649,520	\$47,161,970	\$32,274,100	\$18,214,948	(⁴)	(⁴)	66.2	13.8	46.1	77.2		
Value added by manufacture (value of products less cost of materials).....	\$399,013,072	\$285,641,383	\$281,570,341	\$151,414,674	\$105,286,535	\$71,682,564	41.7	39.7	1.4	86.0	43.8	46.9
Pig iron produced (tons).....	25,651,798	16,623,625	14,447,791	8,845,185	3,375,912	1,832,876	77.5	54.3	15.1	63.3	162.0	84.2
Steel produced (tons).....	23,473,718	13,666,408	10,685,900	4,174,652	1,027,381	(⁴)	119.7	71.8	27.9	155.9	306.3	
Finished rolled products and forgings produced (tons).....	19,276,237	12,759,993	10,398,796	8,023,041	3,414,694	1,566,478	85.4	51.1	22.7	29.6	135.0	118.0

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Excluding statistics for a blast furnace operated by a penal institution.

³ Includes idle establishments.

⁴ Comparable figures not available.

⁵ Includes employees engaged in mining operations when the mines, ovens, quarries, or kilns were owned or operated by concerns operating the blast furnaces.

⁶ Percentage not shown because figures are not strictly comparable.

The number of wage earners in the two industries combined increased from 77,555 in 1869 to 278,505 in 1909, nearly quadrupling. The value added to materials by manufacture was \$71,682,564 in 1869, and almost \$400,000,000 in 1909. The tonnage of products, however, increased much more rapidly than the number of wage earners or the value added by manufacture. The amount of pig iron produced in 1869 was 1,832,876 tons, as compared with 25,651,798 tons in 1909, while the amount of steel produced and the amount of finished rolled products and forgings made by the mills increased in still greater proportion. The table indicates clearly the increased productivity of labor due to improved methods and machinery. The statistics for horsepower are not available for censuses prior to 1889, but during the 20 years from 1889 to 1909 the number of wage earners in the two industries combined in-

creased only 62.7 per cent, while the primary horsepower more than quadrupled. The statistics of capital have very little significance.

Summary for the two industries combined, by states.—Table 4 shows, for blast furnaces and steel works and rolling mills combined, by states, the average number of wage earners and the value added to materials by manufacture in 1909, together with the percentages of increase in these items for the decade 1899-1909 and the two five-year periods. The value of products is not shown because of the extensive duplications. In determining the rank of the states, all states are considered, whether or not they are shown separately in the table. Certain states included under "all other states" held a higher rank than some of the states for which separate figures are given. The pre-dominance of Pennsylvania in these industries is clearly shown in the table.

Table 4

STATE.	BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED.												
	Number of establishments: 1909	Wage earners: 1909			Value added by manufacture: 1909			Per cent of increase. ¹					
		Average number.	Per cent of total.	Rank.	Amount.	Per cent of total.	Rank.	Wage earners (average number).			Value added by manufacture.		
								1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States.....	654	278,505	100.0		\$399,013,072	100.0		25.2	14.7	9.0	42.0	39.6	1.4
Pennsylvania.....	255	141,432	50.8	1	197,834,959	49.6	1	27.6	13.4	12.5	30.8	34.6	-2.8
Ohio.....	115	45,881	16.5	2	73,811,404	18.5	2	36.2	38.2	-1.4	55.0	75.0	-11.4
Illinois.....	30	20,077	7.2	3	37,755,109	9.5	3	20.6	9.4	10.3	103.3	27.1	59.9
New York.....	34	12,389	4.4	5	19,347,032	4.8	4	128.7	36.4	67.7	213.0	89.2	65.4
Wisconsin.....	19	2,882	1.0	10	3,701,885	0.9	10	50.0	20.2	24.8	6.0	(²)	5.9
Kentucky.....	11	2,703	1.0	12	2,581,520	0.6	14	(²)	(²)	(²)	(²)	(²)	(²)
Michigan.....	19	2,199	0.8	16	2,672,627	0.7	13	11.5	1.9	9.4	25.3	9.0	15.0
California.....	5	1,038	0.4	19	1,172,046	0.3	20	87.0	34.3	39.3	197.5	65.1	80.2
Delaware.....	5	710	0.3	20	656,346	0.2	22	-52.3	-32.7	-29.2	-57.0	-0.2	-56.9
All other states.....	161	49,194	17.7		59,480,144	14.9							

¹ A minus sign (-) denotes decrease.

² Included in "all other states" in 1899 and 1904.

³ Less than one-tenth of 1 per cent.

PART III.—BLAST FURNACES.

GENERAL STATISTICS.

Description of the industry.—The iron product of the blast furnace is called "pig iron," regardless of the character or grade of the iron or the disposition made of the product—whether cast into pigs, into finished forms or shapes, or passed on in the molten state to subsequent processes of manufacture. Formerly almost the entire product was cast into pigs, whence originated the term "pig iron." With the development of the steel industry, economy in manufacture was effected by subjecting a large proportion of the iron while yet in the molten state to further manufacturing processes, most of it being converted into steel.

The term "pig iron," unqualified, embraces all grades of iron, including spiegeleisen, ferromanganese, ferrosilicon, and other ferroalloys produced by blast furnaces.¹

¹ Establishments manufacturing ferroalloys in electric furnaces are classified as engaged in the chemical industry, in the branch comprising establishments manufacturing "chemical substances produced by the aid of electricity." The production can not be shown without disclosing individual operations.

Pig iron is classified according to the kind of fuel used in the smelting and also according to the purpose for which it is adapted or according to the composition of the iron. The statistics of the production of pig iron classified according to kind of fuel used and according to grade will be found in later tables.

Inasmuch as statistics for all blast furnaces associated with steel works or other enterprises have been segregated and included in the tables of the present report, it gives a complete presentation of the industry.

Summary and comparison with earlier censuses.—Table 5 summarizes the statistics of the blast-furnace industry for each census from 1869 to 1909, inclusive.

The industry in 1909 employed 38,429 wage earners, to whom \$24,606,530 was paid in wages. The value of the products was reported as \$391,429,283, but the cost of materials (including the large item of fuel cost) was \$320,637,889, equal to 81.9 per cent of the value of products. The processes in the industry are comparatively simple, and the value added by manufacture is relatively much less than in most other industries.

Table 5

	BLAST FURNACES.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904 ²	1899 ²	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	208	190	223	304	341	³ 386	-6.7	9.5	-14.8	-26.6	-10.9	-11.7
Persons engaged in the industry.....	43,061	37,335	41,046	(⁴)	(⁴)	(⁴)	4.9	15.3	-9.0	.....	.....	.....
Proprietors and firm members.....	48	26	48	(⁴)	(⁴)	(⁴)	.....	84.6	-45.8	.....	.....	.....
Salaried employees.....	4,584	2,231	1,757	(⁴)	(⁴)	(⁴)	160.9	105.5	27.0	.....	.....	.....
Wage earners (average number).....	38,429	35,078	39,241	⁵ 33,415	⁶ 41,695	27,554	-2.1	9.6	-10.6	17.4	(⁶)	(⁶)
Primary horsepower.....	1,173,422	773,278	497,272	248,928	(⁴)	63,900	136.0	51.7	55.5	99.8	.....	.....
Capital.....	\$487,580,659	\$236,145,529	\$143,159,232	\$129,547,485	\$89,531,362	\$56,145,326	240.6	106.5	65.0	10.5	44.7	59.5
Expenses.....	\$362,810,409	\$210,555,467	\$159,755,409	\$132,667,435	(⁴)	(⁴)	127.1	72.3	31.8	20.4	.....	.....
Services.....	\$31,131,142	\$21,825,410	\$20,788,520	\$16,226,145	\$12,655,428	\$12,475,250	49.8	42.6	5.0	23.1	(⁶)	(⁶)
Salaries.....	\$6,524,612	\$2,890,897	\$2,304,120	(⁴)	(⁴)	(⁴)	183.2	125.7	25.5	.....	.....	.....
Wages.....	\$24,606,530	\$18,934,513	\$18,484,400	(⁴)	(⁴)	(⁴)	33.1	30.0	2.4	.....	.....	.....
Materials.....	\$320,637,889	\$178,941,918	\$131,503,655	\$110,098,615	\$58,619,742	\$45,493,017	143.8	79.2	36.1	19.4	87.8	23.8
Miscellaneous.....	\$11,041,378	\$9,788,139	\$7,463,234	\$6,342,675	(⁴)	(⁴)	47.9	12.8	31.2	17.7	.....	.....
Value of products.....	\$391,429,283	\$231,822,707	\$206,756,557	\$145,643,153	\$89,315,569	\$69,640,498	89.3	68.8	12.1	42.0	63.1	28.3
Value added by manufacture (value of products less cost of materials).....	\$70,791,394	\$52,880,789	\$75,252,902	\$35,544,538	\$30,695,827	\$24,142,481	-5.9	33.9	-29.7	111.7	15.8	27.1
Pig iron produced (tons).....	25,651,798	16,623,625	14,447,791	8,845,185	3,375,912	1,832,876	77.5	54.3	15.1	63.3	162.0	84.2

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Excluding statistics for a blast furnace operated by a penal institution.

³ Includes idle establishments.

⁴ Comparable figures not available.

⁵ Includes employees engaged in mining operations when the mines, ovens, quarries, or kilns were owned or operated by concerns operating the blast furnaces.

⁶ Percentage omitted because figures are not strictly comparable.

The production of all kinds of pig iron during the census year 1909 amounted to 25,651,798 tons, as compared with 16,623,625 tons in 1904 and 14,447,791 tons in 1899, an increase of 54.3 per cent for the period 1904-1909 and of 15.1 per cent for the period 1899-1904. For the decade the increase was 11,204,007 tons, or 77.5 per cent. During the decade there was, however, a decrease in number of establishments and of wage earners. The value added by manufacture in 1909, though greater than that in 1904, was less than that in 1899, the decrease being due, in the main, to increase in the prices of materials, particularly of ore and coke. The average cost of materials per ton of pig iron in 1909 was \$12.50, or 81.9 per cent of the average value per ton of pig iron produced (\$15.12), whereas in 1899 it was \$9.10, or 63.6 per cent of the value of the pig iron (\$14.29). It should

be borne in mind in this connection, however, that much of the ore and fuel used in blast furnaces at present is produced by the owners of the furnaces or by affiliated concerns, and that the values assigned to materials are doubtless in many cases more or less arbitrary. The decrease in the average number of wage earners is due to improvements in equipment and methods.

There has been an increase in the average annual pig-iron product per wage earner from 265 tons in 1889 to 368 tons in 1899, 474 tons in 1904, and 668 tons in 1909. The average tonnage per wage earner for the largest plants is much higher. The 13 establishments producing over 500,000 tons of iron each employed 9,195 wage earners in 1909 and reported an output of 10,384,146 tons of iron, or an average of 1,129 tons per wage earner.

The figures representing the per capita production of pig iron, as given in Table 6, indicate the great development of the iron and steel industry during the last few decades.

The population is for the year in which the census was taken; the production of pig iron is that, in general, of the preceding calendar year.

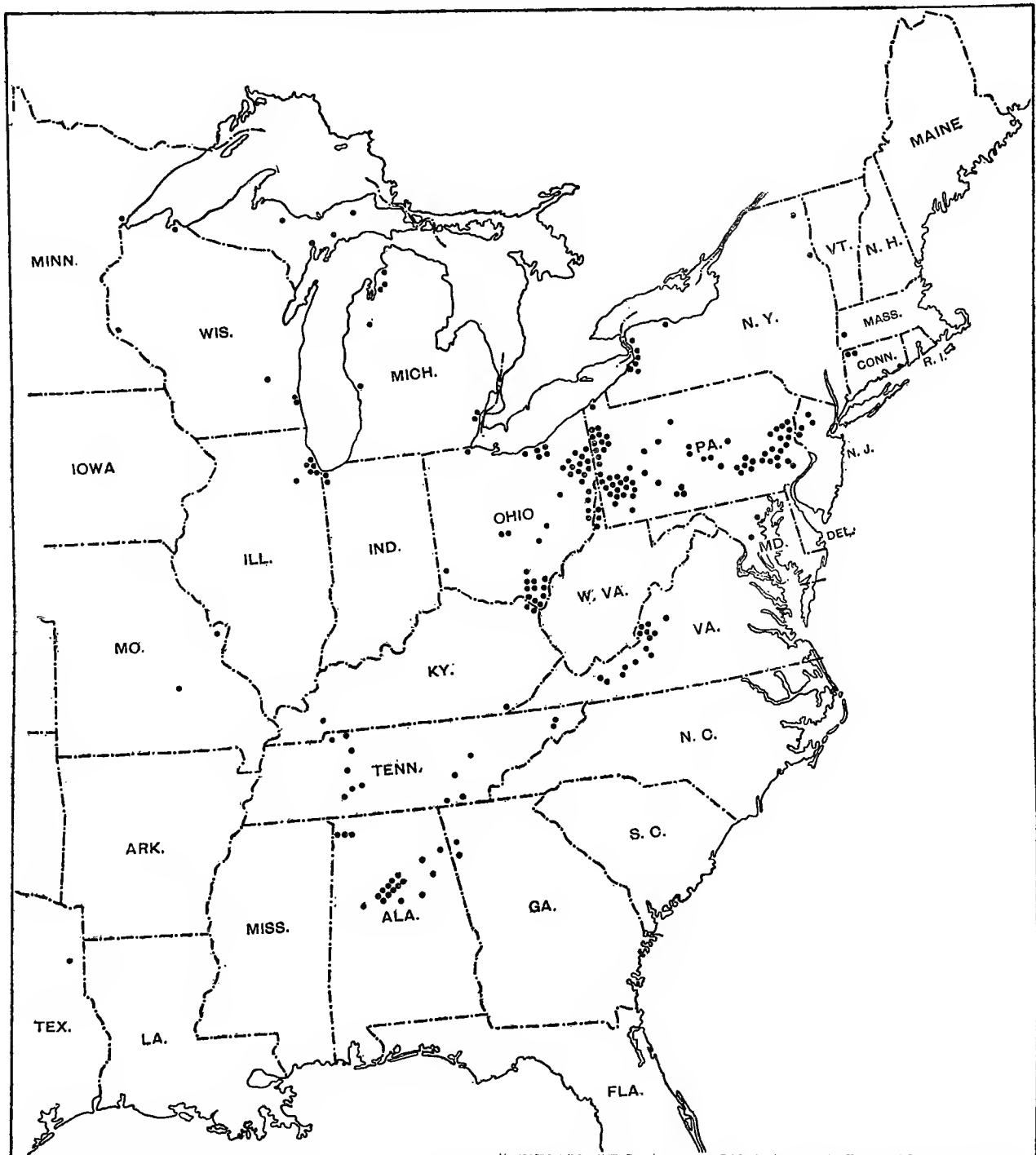
During this period of 40 years the population of the country increased 138.5 per cent, while the pig-iron production increased 1,299.5 per cent.

Geographic distribution.—The distribution of the active blast-furnace establishments is shown by the following map. All establishments of this kind are indicated, with the exception of one in Pueblo County, Colo. On the Pacific coast, one establishment in Washington and one in Oregon were idle in 1909.

Table 6

CENSUS.	Population of the United States.	PIG-IRON PRODUCTION (TONS).	
		Total.	Per capita.
1910.....	91,972,266	25,651,798	0.2789
1900.....	75,994,575	14,447,791	0.1901
1890.....	62,947,714	8,845,185	0.1405
1880.....	50,155,783	3,375,912	0.0673
1870.....	38,558,371	1,832,876	0.0475

BLAST FURNACES—LOCATION OF ESTABLISHMENTS: 1909.



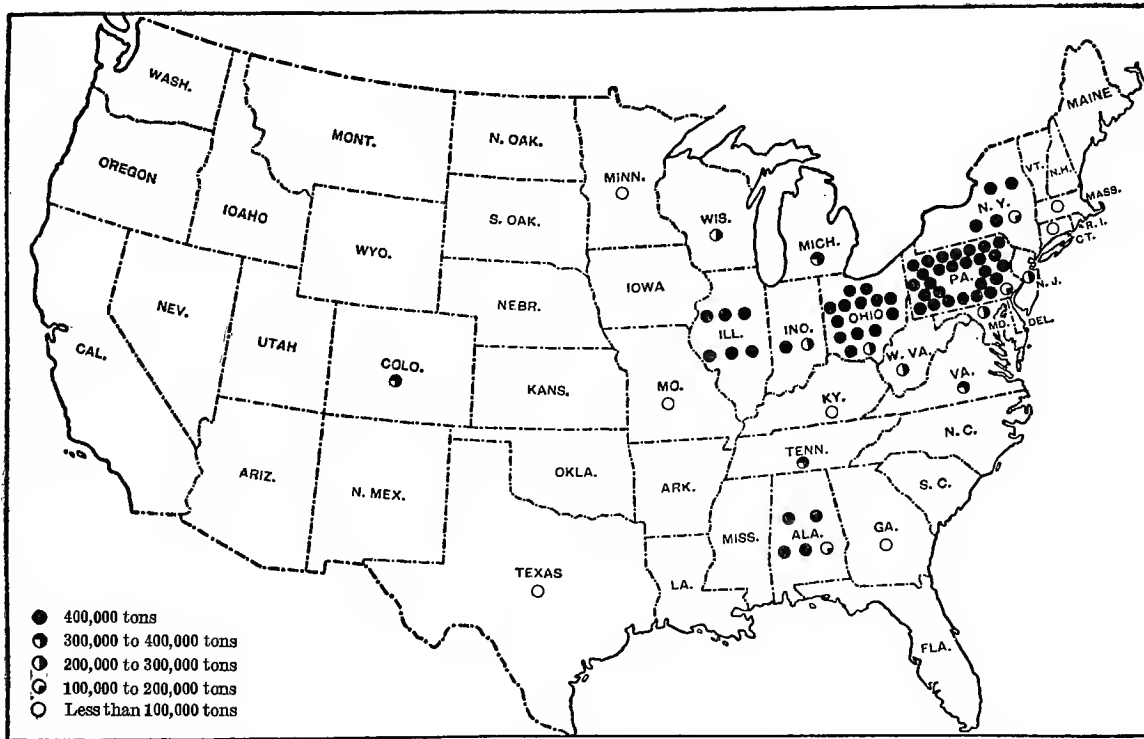
More than two-fifths of the pig-iron product of the country is produced in western Pennsylvania, eastern Ohio (not including counties bordering on Lake Erie), and the panhandle of West Virginia. This district reported, in 1909, 105 active furnaces, which produced 10,677,527 tons of pig iron, or 41.6 per cent of the total output of the country. The ores used are almost exclusively from the Lake Superior district, coming down by water to Lake Erie ports, and thence being transported by rail to the furnaces.

Other important districts in which cheap freights on ore and fuel meet consist of the counties bordering on Lake Erie and on the southern end of Lake Michigan.

The Lake Erie district, comprising parts of Michigan, Ohio, Pennsylvania, and New York, reported 34 furnaces, which produced 3,387,998 tons of pig iron; and the district bordering the southern part of Lake Michigan, including counties in Wisconsin, Illinois, and Indiana, reported 34 furnaces, with an output of 3,228,167 tons. All of the establishments in this region use Lake Superior ores.

The map here presented shows graphically the pig-iron output of the iron-producing states in 1909. Further details as to production, by states, are presented later. The production and rank of the principal states for each census since 1879 are given in Table 20.

PIG-IRON PRODUCTION, BY STATES: 1909.



Summary, by states.—Table 7 summarizes the more important statistics by states, the states being arranged according to the value of products reported for 1909.

STATE.	BLAST FURNACES.																					
	Number of establishments: 1909	Wage earners.			Products.						Value added by manufacture.			Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Total value.			Pig iron (tons).			Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.		
					Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.				1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States ..	208	38,429	100.0	1	\$391,429,283	100.0	1	25,651,798	100.0	\$70,791,394	100.0	1	-2.1	9.6	-10.6	89.3	68.8	12.1	-5.9	33.9	-29.7	
Pennsylvania.....	66	14,521	37.8	1	168,578,413	43.1	1	10,911,670	43.1	26,504,385	37.4	1	-9.7	4.7	-13.7	66.0	56.9	5.8	-29.3	25.4	-43.6	
Ohio.....	40	7,295	19.0	2	83,699,238	21.4	2	5,446,971	21.4	15,274,516	21.6	2	20.8	34.2	-10.0	107.3	104.8	1.2	-9.2	82.2	-50.2	
Illinois.....	6	2,493	6.5	4	38,299,897	9.8	3	2,468,772	9.8	7,391,435	10.4	3	-17.2	30.5	-36.5	152.7	40.1	80.4	114.5	-11.2	141.6	
New York.....	9	2,298	6.0	5	26,620,948	6.8	4	1,717,091	6.8	5,703,788	8.1	5	122.5	47.4	50.9	427.6	208.3	71.1	270.9	152.3	47.0	
Alabama.....	19	3,783	9.8	3	21,235,984	5.4	5	1,764,544	6.8	5,758,623	8.1	4	-24.9	-23.6	-1.6	57.4	27.6	23.4	-2.0	2.2	-4.2	
Michigan.....	11	1,016	2.6	8	5,824,396	1.5	7	327,644	1.3	1,600,885	2.3	6	98.1	-10.8	122.0	150.3	25.4	99.6	73.5	3.9	67.0	
Virginia.....	14	1,320	3.4	6	5,389,287	1.4	8	387,328	1.5	971,086	1.4	9	-17.2	22.1	-32.2	-17.2	61.2	-48.6	-54.4	55.1	-70.6	
Wisconsin.....	5	758	2.0	10	4,793,756	1.2	10	285,454	1.1	875,296	1.2	11	37.6	57.3	-12.5	65.3	55.9	6.0	-1.0	6.3	-6.9	
Tennessee.....	13	1,143	3.0	7	4,653,125	1.2	12	333,416	1.3	1,272,459	1.8	8	-35.2	-15.8	-23.0	-0.9	35.7	-27.0	-16.5	55.3	-46.3	
Kentucky.....	4	331	0.9	14	1,478,595	0.4	15	86,371	0.3	362,765	0.5	16										
All other states.....	21	3,471	9.0	...	30,855,644	7.9	...	1,922,531	...	5,076,156	7.2	...										

¹ Percentages are based upon figures in Table 34. A minus sign (-) denotes decrease.

The table shows that although Pennsylvania is far in advance of all other states, the blast-furnace industry increased much less rapidly, proportionately, between 1899 and 1909 in that state than in either New York, Illinois, Michigan, or Ohio. A further discussion of the relative importance of the states in this industry is presented in connection with the statistics of tonnage. The rankings shown in the table represent the rank of the specified state among all the states, those not shown separately being taken into consideration.

Persons engaged in the industry.—Table 8 shows, by classes, for 1909, the number of persons engaged in the blast-furnace industry.

CLASS.	PERSONS ENGAGED IN THE BLAST-FURNACE INDUSTRY: 1909		
	Total.	Male.	Female.
	All classes.....	43,061	42,715	346
Proprietors and officials.....	1,119	1,112	7
Proprietors and firm members.....	48	43	5
Salaried officers of corporations.....	262	260	2
Superintendents and managers.....	809	809	.....
Clerks.....	3,513	3,182	331
Wage earners (average number).....	38,429	38,421	8
16 years of age and over.....	38,361	38,353	8
Under 16 years of age.....	68	68	.....

Of the total number of persons engaged in the industry, 2.6 per cent were proprietors and officials,

8.2 per cent were clerks (this class including other subordinate salaried employees) and 89.2 per cent were wage earners. The number of women and children employed as wage earners is insignificant.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that shown at the census of 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 9.

CLASS.	PERSONS ENGAGED IN THE BLAST-FURNACE INDUSTRY.				Percent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	43,061	100.0	37,335	100.0	15.3
Proprietors and firm members.....	48	0.1	26	0.1	84.6
Salaried employees.....	4,584	10.6	2,231	6.0	105.5
Wage earners (average number).....	38,429	89.2	35,078	94.0	9.6

Wage earners employed, by months.—Table 10 gives, for 1909, the number of wage earners employed in the blast-furnace industry on the 15th (or the nearest representative day) of each month during the year for the 10 states in which an average of at least 500 wage earners were employed during the year.

STATE.	WAGE EARNERS EMPLOYED IN THE BLAST-FURNACE INDUSTRY: 1909 ¹												
	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	38,429	34,755	34,369	34,156	33,458	34,606	36,537	37,429	38,132	41,988	43,841	45,092	48,727
Alabama.....	3,783	3,567	3,442	3,486	3,401	3,394	3,318	3,477	3,811	4,146	4,306	4,609	4,438
Illinois.....	2,493	2,053	2,252	2,263	2,202	2,412	2,569	2,484	2,309	2,646	2,854	2,874	2,897
Michigan.....	1,016	699	806	836	911	1,055	944	974	1,062	1,235	1,206	1,234	1,227
New Jersey.....	754	632	635	594	553	538	668	729	767	873	945	1,025	1,033
New York.....	2,298	2,016	2,086	2,060	1,989	1,944	2,175	2,349	2,335	2,605	2,649	2,582	2,842
Ohio.....	7,295	6,371	6,214	6,428	6,393	6,458	7,145	7,264	7,226	8,050	8,288	8,535	9,168
Pennsylvania.....	14,521	13,347	12,909	12,559	12,753	13,377	13,801	14,187	14,627	15,926	16,463	16,896	17,407
Tennessee.....	1,143	1,461	1,373	1,213	929	893	947	977	913	1,072	1,245	1,337	1,362
Virginia.....	1,320	1,141	1,147	1,246	1,155	1,114	1,119	1,185	1,433	1,396	1,545	1,652	1,704
Wisconsin.....	758	698	756	765	792	889	817	654	581	743	780	813	804

¹The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

In the industry as a whole the largest number of wage earners employed during any month of 1909 was 46,727, in December, and the smallest number, 33,458, in April. In the majority of the states the maximum number was employed in December and the minimum number in the spring or early summer months. For the entire industry the number employed in April was 71.6 per cent of the number in December. For January the number employed was 74.4 per cent of that in December, the number decreasing from January to April and then increasing from April to December. The average number employed during the year formed 82.2 per cent of the maximum number. This industry is not affected by seasonal

climatic conditions, but is much affected by changes in general business activity. The increase in the number of wage earners from April to December was due to the recovery of business generally after the depression of 1907 and 1908.

Prevailing hours of labor.—In Table 11 the wage earners have been classified according to the hours of labor prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed in each establishment during the year is classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or a less number of hours.

Table 11

AVERAGE NUMBER OF WAGE EARNERS IN THE BLAST-FURNACE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—			
		Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	38,429	190	1,149	4,057	33,033
Alabama.....	3,783		108	1,454	2,221
Illinois.....	2,493				2,493
Michigan.....	1,016			55	961
New Jersey.....	754		86		668
New York.....	2,298		101	374	1,823
Ohio.....	7,295			606	6,689
Pennsylvania.....	14,521	117	601	166	13,637
Tennessee.....	1,143		189		954
Virginia.....	1,320	73		145	1,102
Wisconsin.....	753				753

The operation of a blast furnace is necessarily continuous, and most furnaces operate with two 12-hour shifts and work seven days a week. Of the total number of wage earners, 31,729, or 82.6 per cent, were in establishments where the prevailing hours were over 72 per week, and 1,304, or 3.4 per cent, in establishments where they were 72 per week. No establishments reported their prevailing hours of labor as 54 per week or less, and but one-half of 1 per cent of the wage earners were employed in establishments where the prevailing hours were between 54 and 60 per week, 3 per cent in establishments where they were 60 per week, and 10.6 per cent in establishments where they were between 60 and 72 per week.

Character of ownership.—Only 12 establishments in the blast-furnace industry, or 5.8 per cent of the total number, were owned by individuals or firms in 1909, and the value of the products of such establishments was only \$4,913,632, or 1.3 per cent of the total. The business is one of large units, and is mainly in the hands of corporations.

Size of establishments.—In order to throw some light upon the subject of the prevailing scale of operations in the industry, the establishments are grouped, first, according to value of products, and then according to number of wage earners. It should be noted that in this classification each establishment is considered by itself and no regard is paid to the fact that two or more plants may be controlled by a single concern.

Table 12 groups the establishments according to value of products, and shows for each group, for 1909 and 1904, the value of products and the amount of pig iron produced. It also gives the average value of products and output of pig iron per establishment.

In 1909, 86 of the blast-furnace establishments, or 41.3 per cent of the total number, reported products valued at \$1,000,000 or over, as compared with 49, or 25.8 per cent of the total, in 1904. While these establishments represented a minority of the total number

reported, they reported 85.8 per cent of the total value of products and 86.1 per cent of the pig-iron tonnage in 1909, and 74.8 per cent of the value of all products and 73.5 per cent of the pig-iron tonnage in 1904.

Table 12

BLAST FURNACES.

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.	Value of all products.		Pig iron produced (tons).
		1909.	1904.	
Total:				
1909.....	208	\$391,423,233	231,322,707	25,651,798
1904.....	190			16,623,625
Less than \$100,000:				
1909.....	14	700,718		31,123
1904.....	19	783,533		45,334
\$100,000 and less than \$1,000,000:				
1909.....	108	54,735,742		3,536,186
1904.....	122	57,717,931		4,352,893
\$1,000,000 and over:				
1909.....	86	335,992,823		22,084,489
1904.....	49	175,321,243		12,225,398
Per cent of total:				
1909.....	100.0	100.0		100.0
1904.....	100.0	100.0		100.0
Less than \$100,000:				
1909.....	6.7	0.2		0.1
1904.....	10.0	0.3		0.3
\$100,000 and less than \$1,000,000:				
1909.....	51.9	14.0		13.8
1904.....	64.2	24.9		26.2
\$1,000,000 and over:				
1909.....	41.3	85.8		86.1
1904.....	25.8	74.8		73.5
Average per establishment:				
1909.....		\$1,881,872		123,326
1904.....		1,220,120		87,493

The average number of wage earners per establishment was the same (185) in 1909 as in 1904, but during this five-year period the average value of products per establishment increased from \$1,220,120 to \$1,881,872, or 54.2 per cent, and the average value added by manufacture from \$278,320 to \$340,343, or 22.3 per cent. The average output of pig iron per establishment increased from 87,493 tons in 1904 to 123,326 tons in 1909.

Table 13 gives, for 1909, a classification of establishments according to average number of wage earners, and shows the average number of wage earners employed in establishments of each group for 10 of the leading states.

Of the 208 establishments, 5.3 per cent employed from 1 to 20 wage earners each; 12.5 per cent, from 21 to 50; 25 per cent, from 51 to 100; 35.6 per cent, from 101 to 250; 14.9 per cent, from 251 to 500; and 6.7 per cent, over 500. Of the total number of wage earners, 55.3 per cent were in establishments employing over 250 wage earners. The per cent distribution of the wage earners by groups was as follows: In establishments employing 1 to 50 wage earners, 2.9 per cent; in those employing 51 to 100, 10.7 per cent; in those employing 101 to 250, 31.1 per cent; in those employing 251 to 500, 27.3 per cent; and in those employing over 500, 28 per cent.

Table 13

STATE.	BLAST FURNACES EMPLOYING IN 1909—																	
	TOTAL.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States..	208	38,429	2	7	9	118	26	988	52	4,094	74	11,958	31	10,496	13	9,241	1	1,527
Alabama.....	19	3,783					2	73	3	211	10	1,529	2	727	2	1,243		
Illinois.....	6	2,493							1	80			3	900	2	1,513		
Michigan.....	11	1,016					2	75	6	394	2	284	1	263				
New Jersey.....	4	754							1	86	2	351	1	317				
New York.....	9	2,298							3	281	2	348	3	1,149	1	520		
Ohio.....	40	7,295	1	2			3	112	8	632	20	3,155	6	2,198	2	1,196		
Pennsylvania.....	66	14,521	1	5	5	55	6	251	15	1,137	22	3,938	11	3,705	5	3,903	1	1,527
Tennessee.....	13	1,143					6	241	5	404	1	189	1	309				
Virginia.....	14	1,320			1	20	1	50	7	616	5	634						
Wisconsin.....	5	758			1	15			1	92	2	381	1	270				

Expenses.—As stated in the Introduction, the census does not purport to furnish figures that can be used for determining profits or the total cost of manufacture. Facts of interest can, however, be brought out concerning the relative importance of the principal classes of expense which make up the total. Table 14 shows in percentages, for 1909, 1904, and 1899, the distribution of these expenses among the several classes indicated for the country as a whole, with figures for 10 of the leading states, for 1909 only.

Table 14

STATE.	PER CENT OF TOTAL REPORTED EXPENSES OF BLAST FURNACES REPRESENTED BY—			
	Salaries.	Wages.	Materials.	Miscellaneous expenses.
United States:				
1909.....	1.8	6.8	88.4	3.0
1904.....	1.4	9.0	85.0	4.6
1899.....	1.4	11.6	82.3	4.7
Individual states: 1909:				
Alabama.....	3.9	10.9	81.0	4.2
Illinois.....	1.4	5.2	90.4	2.9
Kentucky.....	2.8	11.8	80.0	5.4
Michigan.....	2.8	11.9	79.4	5.0
New York.....	1.7	7.4	88.0	2.9
Ohio.....	1.8	6.6	88.5	3.1
Pennsylvania.....	1.5	6.0	89.6	2.9
Tennessee.....	3.5	12.4	80.8	3.3
Virginia.....	3.5	10.1	81.8	4.6
Wisconsin.....	2.2	10.6	83.8	3.3

The cost of materials (including fuel) constitutes by far the most important element of expense in pig-iron production. For the United States as a whole a comparison of the per cent distribution of expenses for 1909 with that for 1899 indicates a marked increase in the relative importance of cost of materials and a decrease in that of wages.

Miscellaneous expenses, which constituted 3 per cent of the total expenses in 1909, are relatively less important in this industry than in most others. In fact, among the leading industries, only the construction and repair shops operated by steam-railroad companies and the copper and lead smelting industries show a lower proportion. The percentage for all manufacturing industries combined was 10.5.

Illinois shows, for 1909, the lowest proportion of expenses for services, 6.6 per cent, and the highest for materials, 90.4 per cent. The lowest percentage for materials was reported for Michigan, 79.4 per cent. The lower ratio in this state is due in part to the fact that most of the Michigan plants are charcoal furnaces manufacturing their own charcoal, and in some cases the labor employed in wood cutting and charcoal burning was charged not to material, but to wages.

Engines, power, and fuel.—The amount of power was first reported for the industry at the census of 1869, and the total horsepower increased from 63,900 in 1869 to 1,173,422 in 1909. Table 15 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current) and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments.

Table 15

POWER.	BLAST FURNACES.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	3,093	1,617	1,316	1,173,422	773,278	497,272	100.0	100.0	100.0
Owned.....	2,640	1,603	1,316	1,158,572	773,139	497,272	98.7	100.0	100.0
Steam.....	2,568	1,555	1,294	1,033,033	762,332	494,798	88.0	98.6	99.5
Gas.....	60	27	8	125,230	3,757	122	10.7	0.5	(¹)
Water wheels and motors..	12	21	14	309	630	582	(¹)	0.1	0.1
Other.....				6,320	1,770		0.8	0.8	0.4
Rented—Electric..	453	14		14,850	139		1.3	(¹)	
Electric motors.	3,462	1,384	227	135,143	52,610	8,693	100.0	100.0	100.0
Run by current generated by establishment....	3,009	1,370	227	120,293	52,471	8,693	89.0	99.7	100.0
Run by rented power.....	453	14		14,850	139		11.0	0.3	

¹ Less than one-tenth of 1 per cent.

The total primary power increased from 497,272 horsepower in 1899 to 1,173,422 in 1909, or 136 per cent. This is a rate of increase much higher than that for ore consumption or pig-iron production. This increase in power used doubtless explains in part the fact that the average number of wage earners employed in 1909 was less by 812 than that in 1899.

There has been a striking increase in the use of gas engines. Gas engines are of special interest as they represent largely the utilization of what was formerly a waste product—blast-furnace gas. Some of the gas engines now employed rank in power with the largest steam engines. The 60 gas engines reported in 1909 had an aggregate rating of 125,230 horsepower, or an average of 2,087 horsepower per unit; the largest were of 4,000 horsepower. At the plant of the Indiana Steel Company at Gary, Ind., the use of blast-furnace gas has been carried to

the point where it is the chief reliance as a source of power, and except for various auxiliary purposes and as a reserve in case the blast furnaces are shut down, steam has no place either in the furnace department or in the steel plant or the rolling mill. The air blast is the largest consumer of power in blast-furnace operations, a large furnace requiring 30,000 or more cubic feet of air per minute to be pumped against a pressure of 11 pounds and upward per square inch.

There has also been a very marked increase in the use of electric motors as a means of applying the power generated within the establishment. The total horsepower of such motors increased from 8,693 in 1899 to 120,293 in 1909.

Table 16 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the industry, by states.

Table 16

STATE.	BLAST FURNACES: 1909															
	Primary horsepower.							Electric horsepower.		Fuel used.						
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.				Rented (electric).	Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.						
			Total.	Steam engines.	Gas engines.	Water wheels and motors.				Anthracite (long tons).	Bituminous (short tons).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet). ¹	Charcoal (bushels).
United States...	208	1,173,422	1,158,572	1,033,033	125,230	309	14,850	135,143	120,293	273,543	1,166,135	31,649,865	7,141	19,446	949,622	38,032,618
Alabama.....	19	106,189	106,064	106,040	.....	24	125	7,081	6,956	.....	142,649	2,907,745	91	.....	6,000	3,735,045
Illinois.....	6	70,453	70,053	63,053	7,000	.....	400	5,423	5,023	.....	37,389	2,894,991	950	4,360	.....	.....
Michigan.....	11	17,403	17,403	17,403	.....	.....	.....	1,714	1,714	.....	9,167	123,174	353	.....	.....	21,846,630
New Jersey.....	4	12,025	12,025	12,025	.....	.....	.....	350	350	3,663	7,025	419,491	830	.....	.....	.....
New York.....	9	95,416	86,477	52,157	34,320	.....	8,939	12,479	3,540	1,317	74,586	2,155,893	946	.....	.....	.....
Ohio.....	40	215,739	213,699	194,899	18,800	.....	2,040	25,012	22,972	.....	277,951	6,183,253	521	271	72	16,000
Pennsylvania.....	66	476,680	474,292	449,032	25,100	160	2,388	68,185	65,797	267,478	445,716	13,248,651	2,906	14	940,558	476,790
Tennessee.....	13	18,150	18,150	18,150	.....	.....	.....	310	310	.....	30,298	565,386	152	201	.....	500,897
Virginia.....	14	17,320	17,320	17,320	.....	.....	.....	330	330	.....	39,341	628,163	.....	.....	.....	615,863
Wisconsin.....	5	12,975	12,715	12,715	.....	.....	260	350	590	110	8,902	328,786	125	14,600	129	4,156,473
All other states.....	21	131,072	130,374	90,239	40,010	125	698	13,409	12,711	975	93,111	2,194,332	267	.....	2,863	6,685,115

¹ Exclusive of blast-furnace gas.

² Not including 171,871 cords used for charcoal manufacture, and reported as wood in the tables of Volume VIII (Table 9, Chapter XIII; Table 3, Chapter XIV; and General Table II).

The quantity of each kind of fuel shown in the table includes both that used for smelting and that used for the production of power. The returns for 1904 and prior censuses did not distinguish between the fuel used for smelting and that used for generating power or for other purposes, but the returns for 1909 make this distinction.

The coke, charcoal, and anthracite coal are essentially all used for smelting. In 1909, 115,173 short tons of bituminous coal were used for smelting, leaving a balance of 1,050,962 tons for other purposes. The total expenditure for fuel for both purposes and for rent of power in 1909 was \$108,536,921, as compared with \$44,199,382 in 1899, \$37,893,283 in 1889, and \$21,917,002 in 1879. The increase for the decade 1899-1909 was 145.6 per cent. In 1909 fuel and rent of power accounted for 33.8 per cent of the total cost of materials, as compared with 35.1 per cent in 1904 and 33.6 per cent in 1899. More fuel

is used in the blast-furnace industry than in any other. The amount of coke consumed in 1909, 31,649,865 tons, represents the product of substantially 48,000,000 tons of bituminous coal, equal to over one-eighth of the total production of such coal in that year.

The gas shown in Table 16 is natural gas and does not include blast-furnace gas made and consumed. The quantity of blast-furnace gas utilized as fuel for steam production and in gas engines was reported for a number of the large plants, from which it has been estimated that there was produced by all plants during the year approximately 2,900,000,000 cubic feet of blast-furnace gas, of which only a small portion was utilized. The caloric power of blast-furnace gas is low, about 110 British thermal units per thousand cubic feet, as compared with about 1,100 British thermal units for natural gas, but it represents the equivalent of 290,000,000,000 cubic feet of natural

gas. At the Gary plant, before referred to, approximately 30 per cent of the gas is used for heating the blast, 7.5 per cent for steam production, 12.5 per cent for the gas engines used for blowing, 45 per cent for

the gas engines of the electric power stations which supply power for all other purposes to the entire plant, and 5 per cent is consumed by various auxiliaries or lost in the process of cleaning.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

Materials used—Summary.—Table 17 shows, in detail, the quantity and cost of the materials used in blast furnaces during each census year from 1879 to 1909, inclusive, for the United States as a whole.

Table 17

MATERIAL.	BLAST FURNACES—MATERIALS USED.					
	1909		1904 ¹		1899 ¹	
	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
Total		\$320,637,889		\$178,941,918		\$131,503,655
Iron ore.....	48,353,677	187,264,601	30,032,862	100,945,369	25,366,894	65,902,922
Domestic.....	46,605,930	177,589,789	29,202,944	96,206,246	24,612,511	61,795,473
Foreign.....	1,747,747	9,674,812	829,918	4,739,123	754,383	4,107,449
Mill cinder, scrap, etc.....	1,982,530	5,544,859	1,865,385	3,830,961	1,600,313	3,772,385
Fluxes.....	13,570,845	12,239,493	8,325,209	6,888,647	7,324,743	5,054,725
Fuel:						
Coke.....	² 31,649,865	³ 102,134,423	² 19,739,671	57,126,997	² 16,461,533	38,976,770
Charcoal.....	⁴ 38,032,618	2,787,026	⁴ 37,273,569	2,521,887	⁴ 30,677,585	1,823,881
Anthracite coal.....	273,543	⁵ 904,102	560,637	1,812,779	886,564	2,297,419
Bituminous coal.....	² 1,166,135	⁶ 168,561	² 897,837	1,340,997	² 932,103	1,101,312
Cost of fuel for generating power, and rent of power.....		2,542,809		785,529		(⁸)
All other materials.....		7,052,015		4,388,752		12,574,241

MATERIAL.	BLAST FURNACES—MATERIALS USED—continued.									
	1889		1879		Per cent of increase. ⁹					
	Tons.	Cost.	Tons.	Cost.	1899-1909		1889-1899		1879-1889	
					Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
Total		\$110,098,615		\$58,619,742		143.8		19.5		87.8
Iron ore.....	15,022,421	63,505,530	6,479,182	33,205,278	90.6	184.2	68.9	3.8	131.9	91.3
Domestic.....	14,048,571	57,607,945			89.4	187.4	75.3	7.3		
Foreign.....	973,850	5,897,585			131.7	135.5	-22.5	-30.4		
Mill cinder, scrap, etc.....	1,145,599	3,086,808	316,114	910,667	23.9	47.0	39.7	22.2	262.4	239.0
Fluxes.....	5,021,688	4,196,878	2,829,598	2,547,336	85.3	142.1	45.9	20.6	77.5	64.8
Fuel:										
Coke.....	² 9,237,935	27,435,780	² 2,128,255	8,129,240	92.3	(¹⁰)	78.2	42.1	334.1	237.5
Charcoal.....	⁴ 67,672,156	4,523,320	⁴ 53,909,828	3,679,120	24.0	52.8	-54.7	-59.7	25.5	22.9
Anthracite coal.....	1,796,854	5,165,761	2,334,984	8,012,755	-69.1	(¹⁰)	-50.7	-55.5	-23.0	-35.5
Bituminous coal.....	² 551,008	759,522	² 1,051,753	2,095,887	25.1	(¹⁰)	69.2	45.0	-47.6	-63.8
Cost of fuel for generating power, and rent of power.....		(⁸)		(⁸)						
All other materials.....		1,425,016		39,459						

¹ Excluding statistics for a blast furnace operated by a penal institution.
² Tons of 2,000 pounds.
³ Cost of 31,436,536 tons used for smelting; the cost of coke used for generating power, etc., was not reported separately and is included below under "cost of fuel for generating power."
⁴ Bushels.
⁵ Cost of 265,401 tons used for smelting; the cost of anthracite coal used for generating power, etc., was not reported separately and is included below under "cost of fuel for generating power."
⁶ Cost of 115,173 short tons used for smelting; the cost of bituminous coal used for generating power, etc., was not reported separately and is included below under "cost of fuel for generating power."
⁷ Cost of natural gas and rent of power and heat.
⁸ Not reported separately; fuel included above.
⁹ A minus sign (-) denotes decrease.
¹⁰ Figures not strictly comparable.

Of the total cost of materials in 1909, which amounted to \$320,637,889, that of iron ore and other iron-bearing materials represented 60.1 per cent, that of fluxes 3.8 per cent, that of fuel—for smelting and for other purposes combined—33.8 per cent, and that of all other materials only 2.2 per cent.

Ore.—The consumption of iron ore by blast furnaces in 1909 was 48,353,677 tons. The quantity used increased 90.6 per cent during the decade 1899-1909, as compared with an increase of 68.9 per cent from 1889 to 1899, and 131.9 per cent from 1879 to 1889. The consumption of foreign ore more than doubled during the period 1904-1909.

Foreign ore constituted, in 1909, 3.6 per cent of the total ore consumption, as compared with 2.8 per cent in 1904, 3 per cent in 1899, and 6.5 per cent in 1889. In 1909 the bulk of the foreign ore (73.1 per cent) was consumed by furnaces located in Pennsylvania, the next largest consumer being Maryland. The importations of ore during the year 1909 aggregated 1,909,186 tons, including 212,765 tons of manganese ores and oxides. The imported iron ores were obtained from Cuba, Spain, Newfoundland, Greece, Russia, Sweden, French Africa, and Canada, and the manganese ores and oxides chiefly from British India, Brazil, France, Cuba, England, Japan, Russia, and

Germany. Manganese ore enters into the manufacture of spiegeleisen and ferromanganese.

The total amount of iron ore shipped by mines in this country in 1909, as reported by the mines, was 50,521,208 tons (including ore used by furnaces adjoining the mines). The consumption of domestic ore by the blast furnaces was 46,605,930 tons, and that by the steel works and rolling mills 823,306 tons, making a total consumption of 47,429,236 tons. The difference between production and consumption, approximately 3,000,000 tons, represents increase in stocks at the mines, the lake ports, and the furnaces, together with exports, which amounted to 455,934 tons.

Table 18 shows, by districts, the total amount of iron ore used and sold in 1909, the amount shipped to furnaces owned or controlled by the producer (distinguishing furnaces at a distance and those adjoining the mines), and the quantity sold.

KIND OF ORE AND METHOD OF DISPOSITION.	IRON ORE MINED: 1909	
	Amount (tons).	Per cent of total.
ALL ORE.		
Total amount used or sold	50,521,208	100.0
Used in blast furnaces affiliated with the mines.....	32,239,481	63.8
At a distance.....	27,806,673	55.0
At the mines.....	4,432,808	8.8
Sold.....	18,281,727	36.2
LAKE SUPERIOR ORE.		
Total amount used or sold	41,242,374	81.6
Used in blast furnaces affiliated with the mines.....	25,467,822	50.4
At a distance.....	25,364,248	50.2
At the mines.....	103,574	0.2
Sold.....	15,774,552	31.2
SOUTHERN DISTRICT ORE.		
Total amount used or sold	5,181,805	10.3
Used in blast furnaces affiliated with the mines.....	4,632,318	9.2
At a distance.....	1,164,334	2.3
At the mines.....	3,467,984	6.9
Sold.....	549,287	1.1
ORE OF ALL OTHER DISTRICTS.		
Total amount used or sold	4,097,229	8.1
Used in blast furnaces affiliated with the mines.....	2,139,341	4.2
At a distance.....	1,278,091	2.5
At the mines.....	861,250	1.7
Sold.....	1,957,888	3.9

This table brings out the large extent to which iron mining and iron manufacture are controlled by common interests. Of the total production, 63.8 per cent was for use in furnaces owned or controlled by the same concerns as controlled the mines and only 36.2 per cent was for sale to others. The Lake Superior district (Michigan, Minnesota, and Wisconsin) furnished 81.6 per cent of the total supply, the southern

district (Alabama, Georgia, and Tennessee, 10.3 per cent, and the remainder of the country (chiefly New York, Virginia, Pennsylvania, and New Jersey), 8.1 per cent. Most ore from the Lake Superior district, whether sold or otherwise disposed of, is shipped to a distance, while most southern ore is used by blast furnaces adjoining the mines.

Yield obtained from ore and other iron-bearing material.—In addition to ores the blast furnaces in 1909 smelted 1,982,530 tons of mill cinder, scrap, and other iron materials, making with the ore a total of 50,336,207 tons of iron-bearing material. They produced from this material 25,651,798 tons of pig iron, the average yield thus being equal to 51 per cent of the weight of the iron-bearing materials used. The average yield of pig iron was 52.1 per cent in 1904, 53.6 per cent in 1899, 54.7 per cent in 1889, and 49.7 per cent in 1879. Although these variations in yield are due to some extent to changes in the proportion of foreign ore and of mill cinder, scrap, etc., used, they are due chiefly to changes in the grade of domestic ore used. The increase in the percentage of yield for the decade 1879–1889 was due to the development of the rich deposits of Lake Superior. Twenty years ago almost all the ore shipped from the Lake Superior region analyzed over 60 per cent iron, but in the later years more and more ores of lower grade have been sent down to the furnaces.

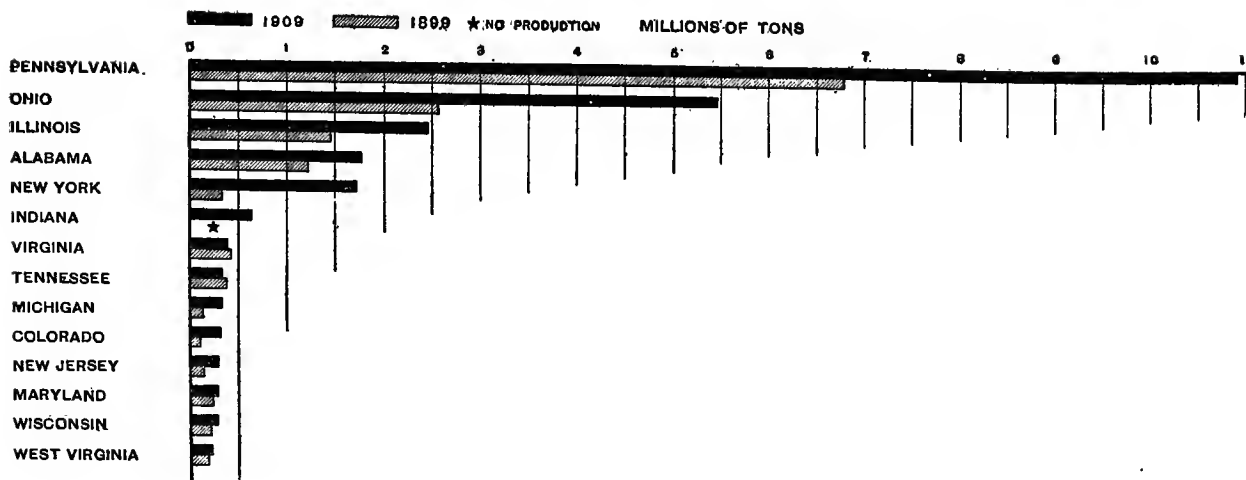
Table 19 shows the average percentage of pig iron from ore (including mill cinder and scrap) for furnaces using exclusively southern ores and furnaces using exclusively Lake Superior ores, respectively.

CLASS.	AVERAGE PERCENTAGE OF PIG IRON FROM ORE.				
	1909	1904	1899	1889	1879
All furnaces	51.0	52.1	53.6	54.7	49.7
Furnaces using southern ores exclusively.....	40.6	41.4	43.1	44.1	43.6
Furnaces using Lake Superior ores exclusively.....	52.3	53.4	57.7	63.3	58.2

There was a greater difference between the two classes of furnaces specified with respect to percentage of yield in 1879 and 1889 than in later years. Both classes of furnaces show a decline in yield since 1889.

Total production of pig iron, by states.—The following diagram shows the production of pig iron, by states, for states having a product in excess of 200,000 tons in 1909. The product of all the states not shown in the diagram aggregated but 256,203 tons in 1909.

PIG-IRON PRODUCTION OF LEADING STATES: 1909 AND 1899.



Comparative statistics, by states, of the number of furnaces (stacks) and the tonnage and value of the pig-iron product are given in Table 20.

Pennsylvania, Ohio, Illinois, and Alabama have been the four leading states in the industry at each of the last four censuses, and Pennsylvania and Ohio, the first and second, respectively, at all censuses covered by the table.

In 1909 Pennsylvania produced 42.5 per cent of the pig iron made in the country; Ohio, 21.2 per cent; Illinois, 9.6 per cent; Alabama, 6.9 per cent; and New

York, 6.7 per cent. These five states together reported nearly seven-eighths of the total.

There is considerable diversity in the average values per ton in the several states, due to differences in distance from markets, in grade of product, and in method of disposition of output. A large part of the product in some states is delivered in a molten condition to steel works forming part of the same plant, while in other states the entire product is cast and sold. Because of the lack of significance in the average values by states they have not been shown in the table.

STATE.	BLAST FURNACES.				STATE.	BLAST FURNACES.			
	Number of completed furnaces at end of year in active establishments.	Production of pig iron.				Number of completed furnaces at end of year in active establishments.	Production of pig iron.		
		Quantity (tons).	Rank of state.	Value.			Quantity (tons).	Rank of state.	Value.
Amount.	Per cent of total.	Amount.			Per cent of total.				
United States:									
1909	388	25,651,798	100.0						
1904	343	¹ 16,625,625	100.0						
1899	343	² 14,447,781	100.0						
1889	473	8,845,185	100.0						
1878	³ 681	3,375,912	100.0						
Pennsylvania:									
1909	145	10,911,676	42.5	1					
1904	131	7,729,278	46.5	1					
1899	136	6,778,584	46.9	1					
1889	202	4,345,986	49.1	1					
1879	269	1,723,492	51.1	1					
Ohio:									
1909	67	5,446,971	21.2	2					
1904	53	2,987,787	18.0	2					
1899	51	2,559,694	17.7	2					
1889	59	1,203,142	13.6	2					
1879	103	489,921	14.5	2					
Illinois:									
1909	23	2,468,772	9.6	3					
1904	21	1,660,610	10.0	3					
1899	17	1,469,530	10.2	3					
1889	14	666,676	7.5	4					
1879	10	85,239	2.5	7					
Alabama:									
1909	40	1,764,544	6.9	4					
1904	38	1,471,378	8.9	4					
1899	37	1,208,277	8.3	4					
1889	47	817,508	9.2	3					
1879	15	55,657	1.6	10					
New York:									
1909	18	1,717,091	6.7	5					
1904	15	609,588	3.7	5					
New York—Continued.									
1899	12	334,512	2.3	7					\$5,042,550
1889	26	307,446	3.5	5					5,182,606
1879	57	279,793	8.3	3					6,697,349
Virginia:									
1909	17	387,328	1.5	7					5,324,997
1904	13	279,103	1.7	8					3,333,273
1899	19	428,117	3.0	5					6,505,218
1889	23	278,899	3.2	6					3,925,481
1879	31	15,988	0.5	17					429,695
Tennessee:									
1909	15	333,416	1.3	8					4,644,667
1904	19	303,624	1.8	6					3,426,932
1899	17	374,249	2.6	6					4,693,215
1889	17	264,187	3.0	7					3,366,464
1879	21	42,744	1.3	13					824,932
Michigan:									
1909	12	327,644	1.3	9					5,694,564
1904	11	270,933	1.6	9					4,630,183
1899	7	141,377	1.0	12					2,327,153
1889	19	203,417	2.3	8					3,982,278
1879	27	106,774	3.2	5					3,123,245
Wisconsin:									
1909	6	285,454	1.1	13					4,591,351
1904	5	189,141	1.1	12					2,761,107
1899	6	217,451	1.5	9					2,899,912
1889	9	192,092	2.2	9					3,114,892
1879	14	105,609	3.1	6					3,293,635
All other states:									
1909	45	2,008,902	7.8						31,819,728
1904	37	¹ 1,122,183	6.7						¹ 16,123,293
1899	41	¹ 941,000	6.5						¹ 14,658,697
1889	57	565,832	6.4						10,575,650
1879	134	470,695	13.9						12,192,834

¹ Not including 4,669 tons, valued at \$66,419, produced by a blast furnace operated by a penal institution.

² Not including 4,443 tons, valued at \$66,645, produced by a blast furnace operated by a penal institution.

³ Furnaces in all establishments, both active and idle.

Production of pig iron, by kind of fuel used.—The value of all products reported for the blast furnaces, and the tonnage and value of the pig-iron product (of

all grades and varieties combined) classified according to the kind of fuel used in smelting, are given in Table 21.

Table 21

	BLAST FURNACES—PRODUCTS.				
	1909	1904	1899	1889	1879
Pig iron, total quantity, tons	25,651,798	16,623,625	14,447,791	8,845,185	3,375,912
Mineral fuel.....	25,279,563	16,214,123	14,095,675	8,251,693	2,987,235
Coke ¹	24,608,572	14,909,029	12,253,818	6,265,865	1,354,958
Anthracite or mixed anthracite and coke ²	670,991	1,305,094	1,841,857	1,985,828	1,632,277
Charcoal.....	372,235	409,502	³ 352,116	593,492	388,677
Per cent of total	100.0	100.0	100.0	100.0	100.0
Mineral fuel.....	98.5	97.5	97.5	93.3	88.6
Coke.....	95.9	89.6	84.8	70.8	40.1
Anthracite or mixed anthracite and coke.....	2.6	7.9	12.7	22.5	48.3
Charcoal.....	1.5	2.5	2.5	6.7	11.5
All products, total value	\$391,429,283	\$231,822,707	\$206,756,657	\$145,643,153	\$89,315,569
Pig iron, total.....	387,830,443	228,911,116	206,512,755	145,612,983	88,204,010
Mineral fuel.....	380,646,786	221,918,031	200,441,796	133,655,273	75,715,266
Coke.....	369,684,636	203,814,049	173,763,091	100,687,256	35,513,233
Anthracite or mixed anthracite and coke.....	10,962,150	18,103,982	26,678,705	32,968,017	40,202,033
Charcoal.....	7,183,657	6,993,085	6,070,959	11,957,710	12,488,744
All other products.....	3,598,840	2,911,591	243,802	30,170	1,111,559

¹ Including pig iron smelted with bituminous coal and coke mixed. The quantity so made in 1909 was 86,420 tons; it was not reported separately for prior years.

² The following quantities were smelted with anthracite alone: 1909, none; 1904, 30,373 tons; 1899, 45,857 tons; 1889, 295,434 tons; 1879, 994,250 tons.

³ Includes 52,992 tons smelted with charcoal and coke mixed.

The percentages of increase in tonnage and value of products for the last three decades, based on Table 21, are shown in Table 22.

PRODUCT.	PER CENT OF INCREASE. ¹		
	1899-1909	1889-1899	1879-1889
All products, total value	89.3	42.0	63.1
Pig iron:			
Tons.....	77.5	63.3	162.0
Value.....	87.8	41.8	65.1
Mineral fuel—			
Tons.....	79.3	70.8	176.2
Value.....	89.9	50.0	76.5
Coke—			
Tons.....	100.8	95.6	362.4
Value.....	112.8	72.6	183.5
Anthracite—			
Tons.....	-63.6	-7.2	21.7
Value.....	-58.9	-19.1	-18.0
Charcoal—			
Tons.....	5.7	-40.7	52.7
Value.....	18.3	-49.2	-4.3
All other products.....	1,376.1	708.1	-97.3

¹ A minus sign (-) denotes decrease.

During the three decades covered by the table, the total production of pig iron increased from 3,375,912 tons to 25,651,798 tons. The highest percentage of increase for any individual decade was 162 per cent from 1879 to 1889, but the absolute increase in tonnage for that decade was less than half that from 1899 to 1909, which amounted to 11,204,007 tons.

The production of mineral-fuel iron formed 88.5 per cent of the total product in 1879 and 98.5 per cent in 1909. The increase in output has been confined to coke iron. The production in 1909 of anthracite iron (including straight anthracite and anthracite and coke mixed) was only about two-fifths that in 1879; and in 30 years it has fallen from 48.4 per cent to 2.6 per cent of the total output of pig iron. Charcoal iron has about held its own in absolute amount. The production of 1909, though somewhat less than that of 1904, was in excess of that of 1899. Coke iron constituted only 40.1 per cent of the total in 1879; in 1909 the proportion was 95.9 per cent.

Table 23 shows the average value per ton, at furnaces, of pig iron made with the several kinds of fuel at each census.

KIND OF FUEL USED.	AVERAGE VALUE PER TON OF PIG IRON PRODUCED.				
	1909	1904	1899	1889	1879
Pig iron, total	\$15.12	\$13.77	\$14.29	\$16.46	\$26.13
Mineral fuel.....	15.06	13.69	14.22	16.20	25.35
Coke.....	15.02	13.67	14.18	16.07	26.21
Anthracite.....	16.34	13.87	14.48	16.60	24.63
Charcoal.....	19.30	17.08	17.24	20.15	32.13

The average value of charcoal iron is considerably higher than the average for the other kinds. The average values reported, except that of charcoal iron, were lower in 1904 than in any other year for which figures are given, but were lower in 1909 than in 1879 or 1889. It is to be borne in mind that a constantly increasing proportion of the product has been consumed in steel works operated by the producer or by affiliated concerns; the value placed upon such interplant or inter-department transfers, however, presumably conforms in general to the commercial value of pig iron sold in the open market. In any case the changes in the average values can not be taken as indicating closely the changes in prevailing prices. The pig iron produced by each class of fuel includes different grades and the proportions represented by the several grades have varied from census to census. Moreover, the value of pig iron at the furnace varies in different parts of the country, and there have been changes in the relative importance of different sections in the production of iron.

Charcoal iron.—For censuses prior to 1909 separate statistics were presented for furnaces using mineral fuel and for those using charcoal. Such statistics have, however, become of little interest, since the product is now practically all made with bituminous fuel.

The special character of the charcoal-iron branch of the industry, however, renders it desirable to present the more important data for it separately.

The manufacture of charcoal iron has fluctuated considerably, but on the whole the production has increased little for more than half a century. In 1854 the production was 305,623 tons and in 1909, 372,235 tons. The maximum production during any census year was 593,492 tons in 1889.

Table 24 gives the statistics for this branch of the industry for the census years from 1889 to 1909.

	1909	1904	1899	1889
Number of establishments.....	26	32	31	83
Salaried employees and wage earners.....	1,663	2,405	1,653	(²)
Salaried employees.....	157	200	147	(²)
Wage earners (average number).....	1,506	2,205	1,506	3,267
Capital.....	\$13,134,329	\$9,778,981	\$5,712,039	\$17,372,724
Expenses.....	\$7,106,100	\$6,672,202	\$4,193,139	\$10,940,204
Services.....	\$1,178,612	\$1,223,984	\$715,473	\$1,549,099
Salaries.....	\$261,091	\$260,350	\$169,120	(²)
Wages.....	\$917,521	\$963,634	\$546,358	(²)
Materials.....	\$5,609,250	\$5,056,194	\$3,216,895	\$8,379,150
Miscellaneous.....	\$318,238	\$392,024	\$260,766	\$1,011,955
Value of products.....	\$7,815,275	\$7,388,748	\$5,277,870	\$11,957,775
Pig iron—				
Tons.....	372,235	409,502	299,124	593,492
Value.....	\$7,183,657	\$6,993,085	\$5,272,094	\$11,957,710
All other products.....	\$631,618	\$395,663	\$5,776	\$65
Value added by manufacture.....	\$2,206,025	\$2,332,554	\$2,060,975	\$3,578,625
Principal materials:				
Iron ore—				
Tons.....	755,075	809,438	588,861	1,160,802
Cost.....	\$2,401,381	\$2,032,596	\$1,054,950	\$3,638,537
Mill cinder, scrap, etc.—				
Tons.....	94	549	949	625
Cost.....	\$263	\$2,045	\$3,224	\$2,417
Fluxes.....				
Tons.....	64,678	68,884	68,483	136,526
Cost.....	\$67,311	\$67,089	\$50,391	\$158,169
Charcoal—				
Bushels.....	38,032,618	39,756,724	28,527,512	67,672,156
Cost.....	\$2,787,026	\$2,694,189	\$1,722,572	\$4,523,320

¹ Not including a blast furnace operated by a penal institution.
² Comparable figures not available.
³ Includes 2,486,700 bushels of charcoal, the stumpage and labor cost of which was reported under "expenses."

Pig iron produced for consumption.—As already stated, while a segregation has in all cases been made between the data for blast furnaces and those for steel works and rolling mills or other related enterprises, each branch of the business being treated as a separate "establishment," yet as a matter of fact the two are very commonly conducted in the same plant. The manufacture of pig iron for consumption was reported by 57 establishments in 1909. These establishments together produced 16,890,473 tons, or 65.8 per cent of the total output, of which amount, 15,858,203 tons, or 93.9 per cent, were for consumption. Both of these percentages are slightly higher than the corresponding percentages in 1904 (65.6 and 91, respectively). In other words, in 1909 over three-fifths of the total output of pig iron was consumed in steel works and rolling mills or in foundries, etc.,

which were affiliated with blast furnaces. Table 25 gives the statistics bearing on this subject.

	BLAST FURNACES.		
	Total.	Establishments producing for consumption in whole or in part.	Establishments producing only for sale.
Number of establishments:			
1909.....	208	57	151
1904.....	190	52	138
Total pig-iron production (tons):			
1909.....	25,651,798	16,890,473	8,761,325
1904.....	16,623,625	10,909,371	5,714,254
For consumption—			
1909.....	15,858,203	15,858,203	.....
1904.....	9,926,545	9,926,545	.....
For sale—			
1909.....	9,793,595	1,032,270	8,761,325
1904.....	6,697,080	982,826	5,714,254
Per cent of total production.....	100.0	100.0	100.0
For consumption—			
1909.....	61.8	93.9	.....
1904.....	59.7	91.0	.....
For sale—			
1909.....	38.2	6.1	100.0
1904.....	40.3	9.0	100.0

The distribution of the pig-iron product may be further summarized for 1909 and 1904, as follows:

METHOD OF DISPOSITION.	1909		1904		Per cent of increase.
	Tons.	Per cent of total.	Tons.	Per cent of total.	
Total production.....	25,651,798	100.0	16,623,625	100.0	54.3
For consumption in works of company producing.....	15,858,203	61.8	9,926,545	59.7	59.8
By steel works and rolling mills.....	15,252,736	59.5	(¹)	.....	.....
Otherwise, by foundries, etc.....	605,467	2.4	(¹)	.....	.....
For sale.....	9,793,595	38.2	6,697,080	40.3	46.2
To steel works and rolling mills.....	3,824,153	14.9	2,264,683	13.6	68.9
To foundries, for export, etc.....	5,969,442	23.3	4,432,397	26.7	34.7
Total for consumption by steel works and rolling mills.....	19,076,889	74.4	12,191,228	73.3	56.5
Total for other consumption, export, etc.....	6,574,909	25.6	4,432,397	26.7	48.3

¹ Figures not available.

Production of pig iron, by grades.—Table 33 gives the production of pig iron, classified by grades, for 1909, by states. The characteristics of the various grades are based on the various uses to which the iron is put or the methods of handling it in subsequent processes. The United States totals are given in Table 27.

Statistics as to the amounts of the different grades of pig iron produced were not taken prior to the census of 1899. Low-phosphorus pig iron was included with Bessemer in that year. Malleable Bessemer, a low-silicon Bessemer used for casting purposes, was not reported separately in 1899. At that census some of the reports included it under Bessemer iron, in some cases it was reported under foundry iron, and in other cases under white and mottled iron and miscellaneous grades.

GRADE.	1909		1904		1899	
	Tons. ¹	Per cent of total.	Tons.	Per cent of total.	Tons.	Per cent of total.
Total.....	25,651,798	100.0	16,623,625	100.0	14,447,791	100.0
Bessemer.....	10,147,052	39.6	8,894,584	53.5	8,475,530	58.7
Low phosphorus.....	248,720	1.0	192,795	1.2	(¹)	.....
Basic.....	7,741,759	30.2	2,553,940	15.4	937,439	6.5
Foundry.....	5,539,410	21.6	3,675,310	22.1	3,510,300	24.3
Forge or mill.....	586,685	2.3	601,677	3.6	1,057,616	7.3
Malleable Bessemer.....	934,211	3.6	316,964	1.9	.....	.....
White, mottled, and miscellaneous.....	110,810	0.4	98,627	0.6	208,323	1.4
Direct castings.....	16,181	0.1	9,469	0.1	7,123	(²)
Spiegeleisen.....	142,223	0.6	166,630	1.0	163,672	1.1
Ferromanganese.....	82,208	0.3	57,072	0.3	51,878	0.4
Ferrosilicon and ferrophosphorus.....	102,539	0.4	53,557	0.3	35,910	0.2

¹ Included with Bessemer.² Less than one-tenth of 1 per cent.

A noticeable fact brought out by the table is the decrease in the relative amount of Bessemer iron produced and the very large increase in that of basic pig iron. This change corresponds to the change that has taken place in the relative importance of the different methods of converting iron into steel.

The production of iron intended for steel making—comprising Bessemer, low-phosphorus and basic pig iron, ferrosilicon and ferrophosphorus, spiegeleisen, and ferromanganese—aggregated 18,464,501 tons in 1909, as compared with 11,921,578 tons in 1904 and 9,664,429 tons in 1899, an increase of 91.1 per cent for the decade. Foundry iron increased 57.8 per cent between 1899 and 1909. On the other hand, iron for use in puddling furnaces—forge, and white and mottled iron—aggregated only 697,495 tons in 1909, as compared with 700,304 tons in 1904 and 1,265,939 tons in 1899, a decrease of 44.9 per cent for the decade.

In 1909 Bessemer pig iron constituted 39.6 per cent of the total, basic, 30.2 per cent, and foundry, 21.6 per cent, leaving only 8.6 per cent for all other grades.

The production of spiegeleisen in 1909 amounted to 142,223 tons, and that of ferromanganese to 82,208 tons, a total of 224,431 tons. There has been little change in the aggregate output of these two grades, but the proportion of ferromanganese in the combined total has materially increased. The production of these grades of iron was all from Pennsylvania and Illinois in 1909, but a few other states produced small quantities in 1904.

In 1909 ferrosilicon was reported as made in Ohio, Kentucky, Tennessee, Pennsylvania, and Illinois, and ferrophosphorus in Tennessee. Other ferroalloys—ferrotitanium, ferrotungsten, ferrovanadium, etc., are products of electric furnaces and are not here included.

Production of pig iron, by method of delivery or casting.—Table 28 gives the pig-iron tonnage according to method of delivery or casting in 1909 and 1904. It shows a large increase in iron passed on in a molten condition to subsequent manufacturing processes. This is usually done only in the furnaces which are associated with steel works. In 1909, 12,197,686

tons, or 47.6 per cent of the total product, was delivered to steel works in a molten condition, as compared with 5,898,744 tons, or 35.5 per cent, in 1904. Although the tonnage both of sand-cast and machine-cast pig iron increased materially during the five-year period, the proportion of the total product consisting of sand-cast iron decreased from 36.6 per cent to 29.8 per cent, and the proportion of machine-cast iron decreased from 25.9 per cent to 19.9 per cent. The production of chill-cast iron and direct castings is relatively small.

METHOD OF CASTING OR DELIVERY.	Number of establishments reporting.		Quantity of product.			
	1909	1904	Tons.		Per cent of total.	
			1909	1904	1909	1904
United States.....	203	190	25,651,798	16,623,625	100.0	100.0
Delivered in molten condition to steel works.....	38	25	12,197,686	5,898,744	47.6	35.5
Sand cast.....	172	165	7,655,568	6,078,844	29.8	36.6
Machine cast.....	49	37	5,096,797	4,307,108	19.9	25.9
Chill cast.....	19	8	685,566	329,460	2.7	2.0
Direct castings.....	15	17	16,181	9,469	0.1	0.1
Pennsylvania.....	66	65	10,911,676	7,729,278	100.0	100.0
Delivered in molten condition to steel works.....	18	11	5,887,507	3,579,501	54.0	46.3
Sand cast.....	50	49	1,907,514	1,490,312	17.5	19.3
Machine cast.....	23	21	2,837,576	2,376,870	26.0	30.8
Chill cast.....	7	4	274,516	279,654	2.5	3.6
Direct castings.....	5	8	4,563	2,941	(¹)	(¹)
Ohio.....	40	33	5,446,871	2,987,787	100.0	100.0
Delivered in molten condition to steel works.....	9	7	2,723,700	1,105,159	50.0	37.0
Sand cast.....	33	30	1,625,073	1,361,161	29.8	45.6
Machine cast.....	12	7	945,036	516,338	17.3	17.3
Chill cast.....	3	.....	152,824	.....	2.8	.....
Direct castings.....	1	5	338	5,129	(¹)	0.2
All other states.....	102	92	9,293,151	5,906,560	100.0	100.0
Delivered in molten condition to steel works.....	11	7	3,586,479	1,214,084	38.6	20.6
Sand cast.....	89	86	4,122,981	3,227,371	44.4	54.6
Machine cast.....	14	9	1,314,185	1,413,900	14.1	23.9
Chill cast.....	9	4	258,226	49,806	2.8	0.8
Direct castings.....	9	4	11,280	1,399	0.1	(¹)

¹ Less than one-tenth of 1 per cent.

Dry-air blast.—The variableness in the humidity of the atmosphere, which interferes greatly with the uniform operation of a furnace, is sometimes overcome by the use of artificially dried air so that the moisture contained may be a minimum and constant quantity. In the report for the census of 1904¹ reference was made to the dry-air blast installation at the Isabella furnaces and comparative statistics were given for runs made with natural air and with air from which moisture had been extracted. At the present census seven establishments reported 14 furnaces as operated with dry blast, the product of these furnaces amounting to 1,418,685 tons of pig iron.

Number and capacity of furnaces.—Table 20 shows the number of completed furnaces of the active establishments in the industry at the end of the respective census years. The increase in the size of furnaces constructed is shown by the fact that during the 20-

¹ Manufactures, 1905, Part IV, p. 45.

year period 1889-1909, although the number of furnaces in active establishments decreased from 473 to 388, the product increased 190 per cent.

The increase in number of stacks from 343 in 1904 to 388 in 1909 does not represent in all cases new furnaces, for there were some stacks in establishments that were idle in 1904 but active in 1909. Reports were not secured from idle establishments at the present census, and consequently statistics are not available relative to the furnace equipment of all establishments.

Of the 388 completed furnaces reported by active establishments at the end of the year 1909, some

were not in operation at any time during the year. There were 370 furnaces active at some time during the year. Twenty-four furnaces in active establishments were idle during the entire year; 11 furnaces were completed during the year; 10 furnaces were in course of construction at the end of the year; 8 furnaces were being rebuilt at the end of the year; and 3 furnaces were abandoned or dismantled during the year.

Table 29 gives, by states, for 1909, 1904, and 1899, the number and daily capacity of the furnaces in active establishments, distributed according to fuel used. In 1889 there were 473 furnaces, with an aggregate daily capacity of 39,411 tons.

STATE, AND KIND OF FUEL USED.	NUMBER OF COMPLETED FURNACES.			DAILY CAPACITY (TONS).			STATE, AND KIND OF FUEL USED.	NUMBER OF COMPLETED FURNACES.			DAILY CAPACITY (TONS).		
	1909	1904	1899	1909	1904 ¹	1899 ¹		1909	1904	1899	1909	1904 ¹	1899 ¹
United States	388	343	343	101,447	77,816	54,433	New Jersey.....	6	8	10	1,440	1,492	737
Coke ²	332	260	^a 227	97,428	69,953	45,070	Coke.....	5	3	1	1,290	1,000	55
Anthracite and coke ⁴	25	48	80	2,545	6,127	7,968	Anthracite and coke.....	1	5	9	150	492	682
Charcoal.....	31	35	36	1,478	1,736	1,397	New York.....	18	15	12	6,508	3,931	1,090
Alabama.....	40	38	37	8,370	6,385	5,216	Coke.....	18	11	4	6,508	3,475	850
Coke.....	37	35	32	8,190	6,205	4,956	Anthracite and coke.....	.....	2	6	.....	303	810
Charcoal.....	3	3	5	180	180	260	Charcoal.....	.....	2	2	.....	153	30
Colorado (coke).....	6	5	2	1,800	1,450	400	North Carolina (coke).....	2	.....	.....	.....	.....	62
Connecticut (charcoal).....	3	3	2	48	48	30	Ohio.....	67	53	51	21,017	15,897	10,468
Georgia.....	2	4	3	130	300	145	Coke.....	66	51	47	21,008	15,865	10,360
Coke.....	1	1	1	70	150	60	Charcoal.....	1	2	4	9	32	108
Charcoal.....	1	3	2	60	150	85	Pennsylvania.....	145	131	136	41,707	33,247	23,497
Illinois (coke).....	23	21	17	7,775	6,552	4,408	Coke.....	117	86	68	39,294	27,891	16,999
Indiana (coke).....	7	.....	.....	3,050	.....	.....	Anthracite and coke.....	24	41	65	2,395	5,332	6,474
Coke.....	6	3	5	710	180	450	Charcoal.....	4	4	3	18	24	24
Charcoal.....	5	3	5	700	180	450	Tennessee.....	15	19	17	1,569	1,939	1,970
Maryland.....	5	5	6	1,415	1,415	1,045	Coke.....	13	17	16	1,545	1,915	1,955
Coke.....	4	4	5	1,400	1,400	1,030	Charcoal.....	2	2	1	24	24	15
Charcoal.....	1	1	1	15	15	15	Texas.....	1	(^c)	2	70	.....	100
Massachusetts (charcoal).....	2	2	3	30	30	40	Coke.....	1	.....	.....	.....	.....	100
Michigan.....	12	11	7	1,208	1,137	480	Charcoal.....	.....	(^c)	2	.....	.....	.....
Coke.....	2	1	.....	321	250	.....	Virginia.....	17	13	19	1,982	1,395	1,907
Charcoal.....	10	10	7	887	887	480	Coke.....	16	12	17	1,970	1,385	1,880
Minnesota (coke).....	1	1	1	225	225	75	Charcoal.....	1	1	2	12	10	27
Missouri.....	2	2	2	208	208	208	West Virginia (coke).....	4	4	3	1,125	1,125	750
Coke.....	1	1	1	150	150	150	Wisconsin.....	6	5	6	1,060	860	755
Charcoal.....	1	1	1	58	58	58	Coke.....	5	4	5	935	735	630
							Charcoal.....	1	1	1	125	125	125

¹ Differences in figures as here given from figures published in former reports are due to changes in rating of capacity. In cases where capacity as reported at the census of 1909 differed from that reported for the same and unaltered furnaces at prior censuses the 1909 rating is used for the former years.

² Includes mixed bituminous coal and coke.

³ Includes 5 mixed charcoal and coke furnaces with a daily capacity of 350 tons.

⁴ Includes furnaces using anthracite alone; none reported in 1909.

⁵ One charcoal furnace was operated by a penal institution.

There has been a marked increase in the output of furnaces. In 1889 the average capacity was 83 tons of pig iron per day; in 1899, 159 tons; in 1904, 227 tons; and in 1909, 261 tons.

During the decade 1899-1909 the number of furnaces increased 13.1 per cent, the aggregate daily capacity 86.4 per cent, and the average capacity per furnace 64.2 per cent. The increase was confined to furnaces using coke. Anthracite furnaces decreased in number and capacity—that is, the furnaces changed from anthracite to coke. Charcoal furnaces were five less in number in 1909 than in 1899, several charcoal furnaces having changed to coke, but they show a slight increase in aggregate capacity.

In 1899, 82.8 per cent of the total capacity was that of coke furnaces, 14.6 per cent that of anthracite and

mixed anthracite and coke furnaces, and 2.6 per cent that of charcoal furnaces; in 1909 the corresponding percentages were 96, 2.5, and 1.5 per cent, respectively.

Table 30 shows the distribution of the furnaces according to size in 1909 and 1904.

In both years the largest number of furnaces was in the group having a daily capacity of 100 to 199 tons. The largest capacity tonnage in 1909 was in the 400 to 499 ton group, and in 1904 in the 300 to 399 ton group. In the two lower groups there was a decrease, and in the four higher groups an increase, both in the number and the capacity of furnaces, between 1904 and 1909. The largest increase both in number of furnaces and in capacity was in the group comprising furnaces of 400 to 499 tons capacity.

Table 30

STATE.	ALL FURNACES.		FURNACES HAVING A DAILY CAPACITY OF—											
			Less than 100 tons.		100 to 199 tons.		200 to 299 tons.		300 to 399 tons.		400 to 499 tons.		500 tons and over.	
	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904
United States:														
Number.....	388	343	57	69	82	95	77	68	81	59	62	31	29	23
Daily capacity, tons....	101,447	177,816	3,006	3,627	11,769	13,586	17,838	15,357	26,568	19,556	28,841	13,590	15,425	12,100
Alabama.....	40	38	5	3	7	24	20	11	8					
Colorado.....	6	5					2	2	4	3				
Connecticut.....	3	3	3	3										
Georgia.....	2	4	2	3		1								
Illinois.....	23	21				2	5	5	13	12			3	2
Indiana.....	7								1					
Kentucky.....	6	3	2	3	3		1				6			
Maryland.....	5	5	1	1					4	4				
Massachusetts.....	2	2	2	2										
Michigan.....	12	11	8	6	3	4	1	1						
Minnesota.....	1	1					1	1						
Missouri.....	2	2	1	1	1	1								
New Jersey.....	6	8		2	3	3	1	1			2	2		
New York.....	18	15		1	1	3	4	4	8	6	1		4	1
Ohio.....	67	53	4	6	11	6	12	13	13	11	20	10	7	7
Pennsylvania.....	145	131	16	27	32	26	23	25	29	22	30	18	15	13
Tennessee.....	15	19	5	6	9	13	1							
Texas.....	1	(²)	1											
Virginia.....	17	13	6	5	9	8	2	2						
West Virginia.....	4	4					2	2	1	1	1	1		
Wisconsin.....	6	5	1		3	4	2	1						

¹ Differences between figures for 1904 as here given and as published in 1905 report are due to changes in rating of capacity of furnaces. In cases where capacity as reported for 1904 differed from that reported for the same furnace, unchanged, in 1909, the later rating is used for both years.
² One furnace was operated by a penal institution in 1904.

Maximum production per furnace.—The record for the maximum production of pig iron in a single day is that of Furnace "K" of the Edgar Thomson group of the Carnegie Steel Company, with an output of 918 gross tons on March 30, 1905; the record prior thereto was 901 tons. The largest production for a week, 5,315 tons, was made by Furnace No. 1 of the Duquesne works of the Carnegie Steel Company for the week March 25–31, 1906; and the largest month's produc-

tion, 21,272 tons, in March, 1905, by the Edgar Thomson Furnace "K." Table 31 gives the statistics in regard to the maximum production for a single day, week, and month for each state in which there are any furnaces with a record of 400 tons or over for a single day. There are, of course, a number of furnaces in some of the leading states which have surpassed the production of any furnace in some of the other states.

Table 31

STATE AND PERIOD.	BLAST FURNACES—MAXIMUM FURNACE RECORDS.				STATE AND PERIOD.	BLAST FURNACES—MAXIMUM FURNACE RECORDS.					
	Pig-iron production (tons).	Date.	Furnace dimensions.			Pig-iron production (tons).	Date.	Furnace dimensions.			
			Height.	Bosh.				Height.	Bosh.		
Pennsylvania:			<i>Ft. in.</i>	<i>Ft. in.</i>	West Virginia:			<i>Ft. in.</i>	<i>Ft. in.</i>		
Day.....	918	March, 1905.....	90 10	22 0	Day.....	569	October, 1907.....	} 82 6	} 21 0		
Week.....	5,315	March, 1906.....	100 0	23 0	Week.....	3,707	October, 1907.....				
Month.....	21,272	March, 1905.....	90 10	22 0	Month.....	14,228	October, 1907.....				
Ohio:			} 106 0	} 23 0	New Jersey:			} 100 0	} 21 0		
Day.....	806	December, 1901.....					Day.....			504	February, 1909.....
Week.....	4,689	March, 1906.....					Week.....			2,940	December, 1908.....
Month.....	19,734	March, 1902.....			Month.....	11,835	January, 1909.....				
Illinois:			} 90 0	} 22 0	Maryland:			} 85 0	} 13 0		
Day.....	727	March, 1909.....					Day.....			452	October, 1909.....
Week.....	4,380	April, 1909.....					Week.....			(¹)	(¹).....
Month.....	18,335	May, 1909.....			Month.....	11,433	July, 1909.....				
New York:			} 94 0	} 24 0	Alabama:			} (2)	} (2)		
Day.....	679	November, 1905.....					Day.....			450	October, 1905.....
Week.....	3,814	October, 1908.....					Week.....			3,250	October, 1905.....
Month.....	16,795	October, 1908.....			Month.....	11,544	October, 1905.....				
Indiana:			} 85 0	} 21 6	Colorado:			} 80 0	} 21 0		
Day.....	591	December, 1909.....					Day.....			442	March, 1909.....
Week.....	3,435	September, 1909.....					Week.....			2,844	March, 1909.....
Month.....	13,639	May, 1909.....			Month.....	11,903	March, 1909.....				

¹ Not reported.

² Capacity in cubic feet, 15,065.

Blast furnaces require relining from time to time. For this and other reasons they shut down—go "out of blast"—for longer or shorter intervals. Table 32

gives the names of those furnaces which at any time since 1880 have been continuously in blast for five years or more, and shows in each case the number of

MANUFACTURES.

DETAILED STATE TABLES.

The principal facts derived from the census inquiry concerning the blast-furnace industry, other than those relating to specific materials, products, and equipment, are presented, by states, in two general tables. Table 34 shows, for 1909, 1904, and 1899, the number of establishments, persons engaged in the in-

dustry, primary power used, capital invested, principal classes of expenses, value of products, and value added by manufacture for the United States and for each of the principal producing states. Table 35 gives more detailed statistics on the same subjects for 1909 only.

BLAST FURNACES—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	208	43,061	48	4,584	38,429	1,173,422	\$487,581	\$6,525	\$24,607	\$320,638	\$391,429	\$70,791
	1904	190	37,335	26	2,231	35,078	773,278	236,146	2,891	18,935	178,942	231,823	52,881
	1899	223	41,046	48	1,757	39,241	497,272	143,159	2,304	18,484	131,504	206,757	75,253
Alabama.....	1909	19	4,325	.....	542	3,783	106,189	23,816	740	2,077	15,477	21,236	5,759
	1904	19	5,216	.....	262	4,954	101,048	19,326	321	1,939	11,012	16,646	5,634
	1899	19	5,182	.....	148	5,034	58,844	11,587	237	1,382	7,610	13,488	5,378
Illinois.....	1909	6	2,927	.....	434	2,493	70,453	52,390	496	1,793	30,908	38,300	7,392
	1904	4	1,993	.....	83	1,910	45,487	14,263	101	1,398	19,005	27,331	8,326
	1899	4	3,220	.....	210	3,010	35,520	10,684	295	2,176	11,708	15,154	3,446
Michigan.....	1909	11	1,101	.....	85	1,016	17,403	8,291	148	632	4,224	5,824	1,600
	1904	11	1,236	.....	97	1,139	7,491	4,253	110	588	3,104	4,644	1,540
	1899	7	557	.....	44	513	2,704	2,030	64	216	1,405	2,327	922
New York.....	1909	9	2,562	.....	264	2,298	95,416	39,666	408	1,758	20,917	26,621	5,704
	1904	9	1,635	.....	78	1,559	39,080	14,045	157	1,161	6,374	8,635	2,261
	1899	9	1,078	.....	45	1,033	15,263	3,396	61	632	3,508	5,046	1,538
Ohio.....	1909	40	8,278	7	976	7,295	215,739	94,533	1,366	5,090	68,425	83,699	15,274
	1904	33	5,829	.....	395	5,434	167,740	43,196	568	3,471	32,477	40,862	8,385
	1899	43	6,342	17	288	6,059	95,040	22,347	342	3,287	23,543	40,367	16,824
Pennsylvania.....	1909	66	16,215	34	1,660	14,521	476,680	194,708	2,400	9,457	142,074	168,578	26,504
	1904	65	14,782	24	891	13,867	304,154	107,742	1,114	7,764	86,322	107,455	21,133
	1899	77	16,712	28	609	16,075	217,326	72,513	787	8,038	64,095	101,575	37,480
Tennessee.....	1909	13	1,268	.....	125	1,143	18,150	7,122	147	519	3,381	4,653	1,272
	1904	13	1,486	.....	128	1,358	21,011	5,688	128	546	2,609	3,428	819
	1899	13	1,845	1	81	1,763	13,350	5,252	103	439	3,169	4,693	1,524
Virginia.....	1909	14	1,425	.....	105	1,320	17,320	6,305	190	546	4,418	5,389	971
	1904	10	1,150	.....	99	1,081	12,465	3,157	82	346	2,717	3,343	626
	1899	16	1,710	.....	116	1,594	21,605	4,783	147	529	4,374	6,505	2,131
Wisconsin.....	1909	5	817	.....	59	758	12,975	6,145	103	497	3,918	4,794	876
	1904	4	521	.....	39	482	5,875	2,649	63	257	2,251	3,075	824
	1899	5	577	.....	26	551	4,160	1,637	42	308	2,015	2,900	885
All other states.....	1909	25	4,143	7	334	3,802	143,097	54,605	527	2,238	26,896	32,335	5,439
	1904	22	3,487	2	191	3,294	68,927	21,227	247	1,465	13,071	16,404	3,333
	1899	30	3,823	2	192	3,629	33,460	8,930	206	1,477	10,077	14,702	4,625

BLAST FURNACES—DETAILED STATISTICS, BY STATES: 1909.

Table 35

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.			Under 16.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.		Male.	Female.
								Maximum month.	Minimum month.						
United States.....	208	43,061	48	1,071	3,182	331	38,429	De 48,727	Ap 33,458	47,278	47,184	10	84	1,173,422	
Alabama.....	19	4,325	.....	208	300	34	3,783	No 4,609	Je 3,318	4,513	4,483	.....	30	106,189
Illinois.....	6	2,927	.....	37	341	56	2,493	De 2,997	Ja 2,053	2,997	2,997	.....	.....	70,453
Kentucky.....	4	359	4	12	10	2	331	Je 481	Au 205	325	325	.....	.....	17,895
Michigan.....	11	1,101	.....	36	44	5	1,016	Se 1,235	Ja 699	1,227	1,226	1	.....	17,403
New York.....	9	2,562	.....	39	200	25	2,298	De 2,842	Ap 1,929	2,842	2,839	3	.....	95,416
Ohio.....	40	8,278	7	202	717	57	7,295	De 9,168	Fe 6,214	9,187	9,184	3	.....	215,739
Pennsylvania.....	66	16,215	34	359	1,182	119	14,521	De 17,407	Mh 12,559	17,556	17,632	.....	24	476,680
Tennessee.....	13	1,268	.....	48	69	8	1,143	Ja 1,461	My 893	1,539	1,526	.....	13	18,150
Virginia.....	14	1,425	.....	31	69	5	1,320	De 1,704	My 1,114	1,699	1,684	.....	15	17,320
Wisconsin.....	5	817	.....	13	41	5	758	My 889	Au 581	804	804	.....	.....	12,975
All other states ¹	21	3,784	3	86	209	15	3,471	.....	.....	4,589	4,584	3	2	135,202

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States.....	\$487,580,659	\$362,810,409	\$3,078,837	\$3,445,725	\$24,606,530	\$103,536,921	\$212,100,968	\$462,404	\$1,684,744	\$68,608	\$8,325,622	\$391,429,283	\$70,791,394
Alabama.....	23,816,400	19,103,561	479,804	260,038	2,077,477	8,383,340	7,094,021	11,615	133,068	3,225	660,973	21,235,984	5,758,623
Illinois.....	52,389,822	34,196,011	174,841	320,726	1,792,965	12,256,101	18,652,361	.....	184,249	.....	814,768	38,299,897	7,391,435
Kentucky.....	2,588,590	1,395,599	24,918	14,001	165,226	379,347	736,483	3,000	24,062	.....	48,362	1,478,595	362,765
Michigan.....	8,290,548	5,317,635	96,434	52,031	632,096	1,865,917	2,357,594	3,000	48,511	12,346	249,706	5,824,396	1,600,885
New York.....	39,666,101	23,769,980	211,226	197,171	1,758,054	7,967,326	12,949,834	78,165	103,635	.....	504,569	26,620,948	5,703,788
Ohio.....	94,532,845	77,273,870	565,058	800,777	5,089,969	21,227,222	47,197,500	38,520	430,205	26,360	1,898,259	83,699,238	15,274,516
Pennsylvania.....	194,708,463	158,531,392	990,977	1,408,840	9,456,714	40,480,064	101,593,964	271,970	568,769	9,445	3,750,649	168,578,413	26,504,385
Tennessee.....	7,122,172	4,186,377	107,846	39,115	519,274	1,802,704	1,577,962	.....	22,922	310	116,244	4,653,125	1,272,459
Virginia.....	6,304,388	5,403,889	121,875	67,653	545,749	1,780,341	2,637,860	27,970	34,439	.....	188,002	5,389,287	971,086
Wisconsin.....	6,144,881	4,674,658	50,840	51,962	497,404	1,860,253	2,058,207	.....	35,147	.....	120,845	4,793,756	875,296
All other states ¹	52,015,949	28,957,637	255,068	233,411	2,071,602	10,534,306	15,245,182	28,164	99,737	16,922	473,245	30,855,644	5,076,156

¹ All other states embrace: Colorado, 1 establishment; Connecticut, 2; Georgia, 2; Indiana, 2; Maryland, 2; Massachusetts, 1; Minnesota, 1; Missouri, 2; New Jersey, 4; Texas, 1; West Virginia, 3.

PART IV.—STEEL WORKS AND ROLLING MILLS.

GENERAL STATISTICS.

Description of the industry.—The establishments assigned to this classification are engaged primarily in the conversion of iron into steel and in the rolling of iron and steel. The statistics also include the figures for forges and bloomeries, which at earlier censuses were tabulated separately. Formerly the manufacture, for sale as such, of hammered charcoal blooms, billets, and bars direct from the ore and from pig iron and scrap was an important part of the industry, and in 1869 there were still 82 establishments of this class, but by 1899 the number of active establishments was reduced to 7, and the tabulation of the statistics for this class of establishments as a separate industry was discontinued in 1904.

In addition to the establishments classified as "steel works and rolling mills" there were, in 1909, 29 establishments which were engaged primarily in making other more highly finished products but which had steel-making or hot-rolling facilities as minor features of their equipment. These 29 establishments were in the following industries: Agricultural implements, 1; steam-railroad cars, 4; cutlery and tools, 1; electrical machinery, apparatus, and supplies, 2; files, 1; foundry and machine-shop products, 16; saws, 1; shipbuilding, 1; and wire, 2. Data for these establishments are not included in the present section except as indicated.¹

Many steel-rolling establishments subject the primary products of the rolling mill to further processes of

manufacture; for example, they manufacture wire from wire rods, wrought-welded pipe and tubes from skelp, cut nails from nail plates, etc. The statistics in the present section show not only the direct or primary rolled products of the mills, but also such more highly finished products as were made therefrom in the same establishments, except that the tin-plate dipping departments of rolling mills have been treated as separate establishments. The relation of the steel works and rolling mills to the blast furnaces has already been discussed.

Summary and comparison with earlier censuses.—Table 36 summarizes the statistics for the industry for each census from 1869 to 1909, inclusive.

Steel works and rolling mills constitute one of the largest industries in the country. The number of persons engaged in the industry in 1909 was 260,762, of whom 240,076 were wage earners, the amount paid in wages being \$163,200,758. The value of products shown in the table conveys no precise idea as to the magnitude of the industry, since it involves considerable duplication due to the sale or transfer of the products of one establishment in the industry to another establishment in the industry for use in further manufacture. Similarly, the reported cost of materials involves much duplication. Were it not for this duplication within the industry itself, the ratio of the value added by manufacture to the value of products would be much higher. The value added by manufacture in 1909 was \$328,221,678.

¹ The value of the steel castings and rolled-steel products of these 29 establishments was \$6,627,039, of which \$5,013,407 represented that of products for consumption in the same establishments and \$1,613,632 that of products for sale.

	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
	Number of establishments.....	446	415	445	415	451	2422	0.2	7.5	-6.7	7.2	-8.0	6.9
Persons engaged in the industry.....	260,762	221,956	190,825	(3)	(3)	(3)	36.6	17.5	16.3	.....	.....	.....
Proprietors and firm members.....	47	64	122	(3)	(3)	(3)	-61.5	-26.6	-47.5	.....	.....	.....
Salaried employees.....	20,639	14,330	7,454	(3)	(3)	(3)	176.9	44.0	92.2	.....	.....	.....
Wage earners (average number).....	240,076	207,562	183,249	137,766	99,103	50,001	31.0	15.7	13.3	33.0	(4)	(4)
Primary horsepower.....	2,100,978	1,649,209	1,100,801	535,430	(3)	(3)	90.9	27.4	49.8	105.6	.....	.....
Capital.....	\$1,004,735,111	\$700,182,310	\$430,232,431	\$276,224,301	\$120,373,603	\$65,626,748	133.5	43.5	62.7	55.8	129.5	83.4
Expenses.....	889,501,220	618,930,751	527,475,387	308,556,550	(3)	(3)	68.6	43.7	17.3	70.9	.....	.....
Services.....	189,392,222	140,352,488	111,769,244	79,510,047	42,796,082	28,039,731	69.4	34.9	25.6	40.6	85.8	52.6
Salaries.....	26,191,464	17,860,495	9,433,368	(3)	(3)	(3)	177.6	46.6	89.3	.....	.....	.....
Wages.....	163,200,758	122,491,993	102,335,876	(3)	(3)	(3)	59.5	33.2	19.7	.....	.....	.....
Materials.....	657,500,856	441,204,432	390,895,277	217,174,230	132,651,408	90,028,115	68.2	49.0	12.9	80.0	63.7	47.3
Miscellaneous.....	42,608,142	37,373,831	24,810,866	11,872,273	(3)	(3)	71.7	14.0	50.6	109.0	.....	.....
Value of products.....	985,722,534	673,965,026	597,211,716	333,044,366	207,242,116	137,568,198	65.1	45.3	12.9	79.3	60.7	50.6
Value added by manufacture (value of products less cost of materials).....	328,221,678	232,760,594	206,316,439	115,870,136	74,590,708	47,540,083	59.1	41.0	12.8	78.1	55.3	56.9

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Includes idle establishments, which were not reported separately in 1869.

³ Comparable figures not available.

⁴ Percentage omitted because figures are not strictly comparable.

Because of the possibility that the amount of duplication in value of products and cost of materials may have varied more or less from census to census, the

statistics for these items may not be altogether comparable. Doubtless, however, they do show roughly the growth in the volume of business as meas-

ured in terms of money. Because of changes in prevailing prices of iron and steel products from time to time, however, the statistics as to value of products do not very closely represent the changes which have taken place in the quantity of output.

The total number of establishments, including forges and bloomeries for all years, has not varied greatly, the increase for the 40 years covered by the table being only 5.7 per cent. In the case of value of products, however, the amount for 1909 was over seven times that for 1869 and the average value of products per establishment shows a steady increase from census to census—from \$325,991 in 1869 to \$2,210,140 in 1909. The rate of increase in value of products for the successive decades has been quite uniform, ranging from a minimum increase of 50.6 per cent for the decade 1869—1879 to a maximum of 79.3 per cent for the decade 1889—1899. The increase in value of products from 1899 to 1909 is perhaps partly attributable to advance in prices, but for some of the more important products the prices—at least the quoted prices in trade journals—were substantially the same in both years.

Table 37, which gives separately the total number of establishments and value of products for the steel works and rolling mills proper and for forges and bloomeries at each decennial census since 1879, indicates the comparative unimportance of the latter at the present time.

	The combined industry.	Steel works and rolling mills proper.	Forges and bloomeries.
Number of establishments:			
1909.....	446	442	4
1899.....	445	438	7
1889.....	415	395	20
1879.....	451	358	93
Value of products:			
1909.....	\$985,722,534	\$985,374,068	\$348,466
1899.....	597,211,716	596,689,284	522,432
1889.....	333,044,366	331,860,872	1,183,494
1879.....	207,242,116	203,274,042	3,968,074

Geographic distribution.—The steel-works and rolling-mill industry is concentrated largely in the Middle Atlantic and East North Central states, and the panhandle of West Virginia. Of the 446 establishments in 1909, 362, or 81.2 per cent, were located in seven contiguous states—New York, New Jersey, Pennsylvania, West Virginia, Ohio, Indiana, and Illinois. The value of products for these seven states amounted to \$897,365,567, or 91 per cent of the total for the United States. The map on the next page shows the location of the establishments in each state as far west as Minnesota and Missouri. In addition, Texas, Colorado, Wyoming, and Washington reported 1 establishment each, Oregon reported 2, and California 5.

Leading counties.—There are 36 counties which for 1909 reported products from steel works and rolling

mills exceeding \$5,000,000 in value each. These 36 counties contained 251 establishments, or 56.3 per cent of the total for the industry, with products valued at \$865,248,156, or 87.8 per cent of the total. Of these counties 15 are in Pennsylvania, 7 in Ohio, 4 in Illinois, 2 in Indiana, 2 in West Virginia, and 1 each in Alabama, Colorado, Maryland, Massachusetts, New York, and Wisconsin. Table 38 gives for these counties the number of establishments and the value of products so far as this can be shown without disclosing individual operations. The counties are arranged in the order of value of products.

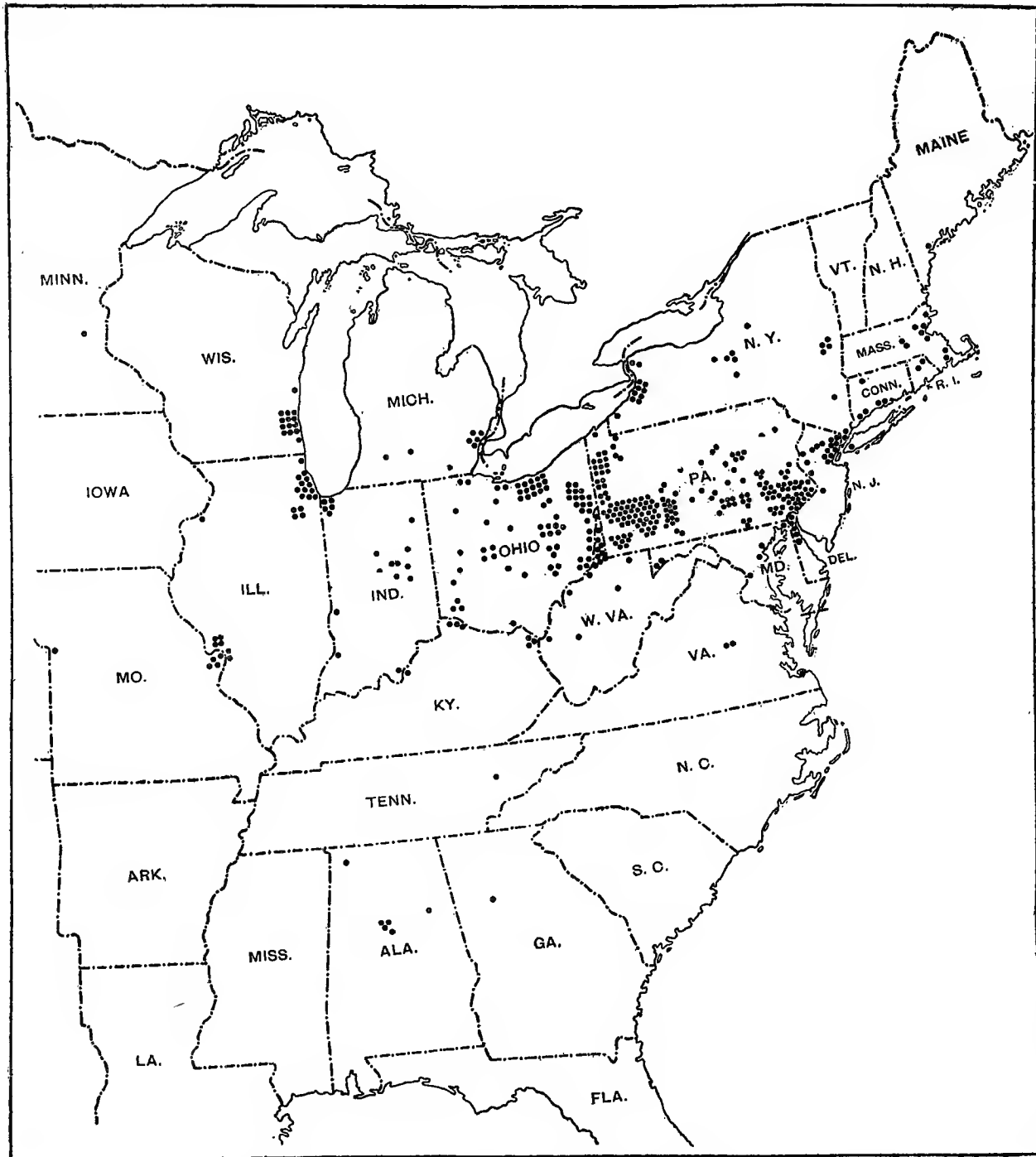
COUNTY.	STEEL WORKS AND ROLLING MILLS: 1909		
	Number of establishments.	Value of products.	
		Amount.	Per cent of total.
United States.....	446	\$985,722,534	100.0
Counties with products valued at \$5,000,000 and over:			
Allegheny, Pa.....	55	241,126,750	24.5
Mahoning, Ohio.....	9	62,664,563	6.4
Cook, Ill.....	11	48,522,605	4.9
Westmoreland, Pa.....	15	40,366,714	4.1
Cuyahoga, Ohio.....	15	39,580,581	4.0
Erie, N. Y.....	8	27,775,674	2.8
Dauphin, Pa.....	6	23,363,013	2.4
Lake, Ind.....	5	23,009,369	2.3
Jefferson, Ohio.....	3	22,507,222	2.3
Washington, Pa.....	9	22,316,607	2.3
Lawrence, Pa.....	4	21,521,969	2.2
Mercer, Pa.....	11	20,073,466	2.0
Montgomery, Pa.....	8	16,058,535	1.6
Chester, Pa.....	5	15,745,014	1.6
Philadelphia, Pa.....	8	11,788,721	1.2
Milwaukee, Wis.....	12	10,671,641	1.1
Stark, Ohio.....	8	10,543,760	1.1
Belmont, Ohio.....	4	10,506,347	1.1
Berks, Pa.....	10	9,763,311	1.0
Madison, Ind.....	3	7,570,027	0.8
Ohio, W. Va.....	5	7,015,595	0.7
Madison, Ill.....	4	6,272,950	0.6
Tuscarawas, Ohio.....	3	5,907,154	0.6
Lehigh, Pa.....	3	5,896,364	0.6
Lebanon, Pa.....	5	5,098,452	0.5
Other counties (11) ¹	22	149,581,752	15.2
All other counties.....	195	120,474,378	12.2

¹ Includes Lorain in Ohio; Cambria, Northampton, and Mifflin in Pennsylvania; Will and Lake in Illinois; Pueblo in Colorado; Worcester in Massachusetts; Baltimore in Maryland; Marshall in West Virginia; and Jefferson in Alabama.

Different classes of works.—The steel-works and rolling-mill industry comprises three classes of establishments: (1) Those equipped both with furnaces for making steel and with hot rolls for rolling it; (2) those equipped with steel furnaces but not with hot rolls; and (3) those equipped with hot rolls but not with steel furnaces. Most of the largest establishments belong to the first group. All steel plants operated in conjunction with blast furnaces are also equipped with rolling departments. On the other hand, no establishments of the second group have blast furnaces, but all buy pig iron and scrap for steel making. Establishments of the third group include those purchasing their material in the form of ingots, blooms, slabs, or other shapes, pig iron for puddling furnaces, and also the few independent bloomeries.

MANUFACTURES.

STEEL WORKS AND ROLLING MILLS—LOCATION OF ESTABLISHMENTS: 1909.



NOTE.—The total number of establishments in Allegheny County, Pennsylvania (55), not shown because of lack of space.

Table 39 shows, for 1909, the number of establishments and value of products for the respective groups for the United States and the states of Pennsylvania and Ohio. In the country as a whole steel works and rolling mills combined produced 61.6 per cent of the aggregate value of products in 1909; steel works with-

out rolling mills, only 4.7 per cent; and rolling mills without steel works, 33.8 per cent. These percentages, however, give a somewhat exaggerated idea of the importance of the latter class of mills, because the value of their product consists in considerable part of the value of the crude steel purchased.

Females constituted 1.1 per cent of the total number of persons employed, 10.9 per cent of the clerks, and four-tenths of 1 per cent of the wage earners. The number of wage earners under 16 years of age was 1,139.

In order to compare the distribution according to occupational status of persons engaged in the industry in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such comparison is made in Table 42. The rate of increase for salaried employees was much higher than that for wage earners, the proportion for the latter class being less in 1909 than in 1904.

CLASS.	1909		1904		Per cent of increase: 1904-1909 ¹
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	280,782	100.0	221,958	100.0	17.5
Proprietors and firm members...	47	(²)	64	(²)	-26.6
Salaried employees.....	20,639	7.9	14,330	6.5	44.0
Wage earners (average number)...	240,076	92.1	207,562	93.5	15.7

¹ A minus sign (-) denotes decrease.
² Less than one-tenth of 1 per cent.

Table 43 shows the average number of wage earners, distributed according to age periods, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899.

CLASS.	1909		1904		1899	
	Number.	Per cent of total.	Number.	Per cent of total.	Number.	Per cent of total.
Total.....	240,076	100.0	207,582	100.0	183,248	100.0
16 years of age and over..	233,937	99.5	205,741	99.1	181,439	99.0
Male.....	237,996	99.1	204,290	98.4	180,374	98.4
Female.....	941	0.4	1,451	0.7	1,065	0.6
Under 16 years of age.....	1,139	0.5	1,821	0.9	1,810	1.0

There was an increase from 1899 to 1904 in the number of women employed and a slight increase in the number of children, but in 1909 the number reported for each of these two classes was less than in 1899.

Wage earners employed, by months.—Table 44 gives the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 for 15 states in which an average of at least 500 wage earners were employed during the year.

STATE.	Average number employed during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		United States.....	240,076	216,349	215,650	215,076	217,307	218,424	235,533	234,151	242,077	258,925	269,255	274,625	283,629
California.....	1,038	1,065	1,073	1,089	1,100	1,037	1,098	716	824	1,041	1,097	1,176	1,144
Connecticut.....	2,352	<i>2,041</i>	2,219	2,084	2,053	2,109	2,257	2,338	2,426	2,471	2,605	2,729	2,867
Delaware.....	710	589	579	<i>559</i>	578	629	673	717	826	794	803	859	909
Illinois.....	17,584	16,108	15,758	<i>15,231</i>	16,145	15,424	16,219	16,750	16,442	18,875	20,203	21,552	22,141
Indiana.....	12,255	<i>10,288</i>	10,860	11,501	11,163	10,995	11,450	11,655	12,445	13,444	14,066	14,407	14,808
Kentucky.....	2,372	2,395	2,444	<i>2,048</i>	2,332	2,231	2,398	2,186	2,443	2,435	2,468	2,504	2,484
Massachusetts.....	3,115	2,990	2,958	2,898	<i>2,820</i>	2,866	3,050	3,035	3,065	3,225	3,438	3,479	3,544
Michigan.....	1,183	1,091	1,264	1,112	1,167	1,109	1,123	<i>1,050</i>	1,121	1,175	1,266	1,388	1,331
Missouri.....	2,227	1,761	1,926	1,992	2,049	1,778	2,108	2,102	1,878	2,396	2,636	2,989	3,128
New Jersey.....	4,671	4,409	4,282	4,522	4,341	<i>4,256</i>	4,297	4,264	4,538	4,937	5,184	5,266	5,773
New York.....	10,091	9,587	9,556	<i>9,492</i>	9,710	8,841	9,974	9,496	9,186	10,691	11,358	11,423	11,785
Ohio.....	38,586	34,295	<i>33,845</i>	35,415	34,696	35,682	40,633	37,446	39,548	40,836	42,549	42,936	45,151
Pennsylvania.....	126,911	114,241	113,347	<i>111,954</i>	114,449	116,987	123,920	125,641	129,745	137,838	142,009	144,210	148,591
West Virginia.....	5,060	<i>3,469</i>	3,502	3,625	3,890	4,028	5,944	5,783	5,966	<i>6,288</i>	6,197	6,055	5,973
Wisconsin.....	2,124	1,731	1,793	1,815	1,962	1,970	2,034	2,145	2,239	2,370	2,367	2,463	2,804

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

In the industry as a whole and in all of the states shown except four the largest number employed during any month in 1909 was in December, and in three of the other states the largest number was in November. In the country as a whole the minimum number employed was in March, this number being 75.8 per cent of the number in December. Massachusetts shows the smallest fluctuation in number of wage earners, the minimum number being 79.6 per cent of the maximum, while West Virginia shows the widest fluctuation, the minimum number being 55.2 per cent of the maximum number, reported for September. The percentage which the number employed each month represented of the maximum number is given in Table 45 for the entire industry. The general in-

crease in employment from March to December reflects the improvement in business conditions taking place during that time.

MONTH.	Per cent of maximum.	MONTH.	Per cent of maximum.
January.....	76.3	July.....	82.6
February.....	76.0	August.....	85.3
March.....	75.8	September.....	91.3
April.....	76.6	October.....	94.9
May.....	77.0	November.....	96.8
June.....	83.0	December.....	100.0

The months of maximum and of minimum employment for 1909, and the number reported for these months, are given for each state in Table 44.

Prevailing hours of labor.—In Table 46 the wage earners have been classified according to the hours of labor prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or less number of hours.

Table 46

AVERAGE NUMBER OF WAGE EARNERS IN STEEL WORKS AND ROLLING MILLS: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	240,076	18,283	4,094	23,982	29,022	82,130	30,247	52,318
California.....	1,038		348	69	179	442		
Connecticut.....	2,352		160	147	1,984	61		
Delaware.....	710	290			420			
Illinois.....	17,584			2,763	1,142	3,230	247	10,202
Indiana.....	12,255	101		1,647		4,120	1,518	4,869
Kentucky.....	2,372	1,446			256	180		490
Massachusetts.....	3,115		13	39	376	2,687		
Michigan.....	1,183				317	866		
Missouri.....	2,227	846				1,381		
New Jersey.....	4,671		225	1,007	2,134	224	1,081	
New York.....	10,091		67	423	1,695	4,745		3,161
Ohio.....	38,586	1,483	44	5,442	7,260	13,352	6,296	4,709
Pennsylvania.....	126,911	12,245	3,237	11,014	12,292	45,527	17,921	24,675
West Virginia.....	5,060	1,779		812	312	315	1,842	
Wisconsin.....	2,124	10		102	977			1,025

Of the total number of wage earners in 1909, 34.2 per cent were in establishments where the prevailing hours were 60 per week, or 10 hours a day for six days in the week, while 34.4 per cent were in establishments where the prevailing hours were over 60 per week, and 21.8 per cent where they were 72 per week and over. The eight-hour day is not found to any large extent, only 9.3 per cent of the wage earners being employed in establishments where the prevailing hours were less than 54 per week. The proportion in establishments in which the prevailing hours of labor were 72 or more per week was especially high in Illinois, Wisconsin, and Indiana.

Character of ownership.—Table 47 has for its purpose the presentation of conditions in respect to the character of ownership, or legal organization, of establishments. Establishments owned by individuals and firms are few and small, and seem to be decreasing in number and importance from census to census. Steel works and rolling mills are more largely in the hands of corporations than any other industry in the country with the exception of the lead smelting and refining industry. Establishments operated by corporations reported 99.5 per cent of the total value of products in 1909, as compared with 98.9 per cent in 1904.

Table 47

STEEL WORKS AND ROLLING MILLS.

CHARACTER OF OWNERSHIP.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	446	415	\$985,722,534	\$673,965,028
Individual.....	8	11	937,230	1,683,223
Firm ¹	14	19	4,238,687	5,641,183
Corporation.....	424	385	980,546,617	666,630,620
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	1.8	2.7	0.1	0.3
Firm ¹	3.1	4.6	0.4	0.8
Corporation.....	95.1	92.8	99.5	98.9
Average per establishment:				
Individual.....			\$117,154	\$153,929
Firm.....			302,763	296,904
Corporation.....			2,312,610	1,731,598

¹ Includes one establishment under "other" ownership in 1904.

Size of establishments.—The tendency toward concentration in large establishments is very marked in the steel industry. Some light is thrown upon this tendency by grouping the establishments reported according to value of products and according to number of wage earners.

Table 48 gives data for establishments classified according to the value of their products.

Table 48

STEEL WORKS AND ROLLING MILLS.

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	446	415	\$985,722,534	\$673,965,028
Less than \$20,000.....	15	13	195,454	133,948
\$20,000 and less than \$100,000.....	44	44	2,643,474	2,357,509
\$100,000 and less than \$1,000,000.....	201	227	86,119,267	101,297,782
\$1,000,000 and over.....	186	131	896,764,339	570,175,787
\$1,000,000 and less than \$10,000,000.....	163	116	471,227,229	323,487,102
\$10,000,000 and over.....	23	15	425,537,110	246,688,685
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$20,000.....	3.4	3.1	(¹)	(¹)
\$20,000 and less than \$100,000.....	9.9	10.6	0.3	0.3
\$100,000 and less than \$1,000,000.....	45.1	54.7	8.7	15.0
\$1,000,000 and over.....	41.7	31.6	91.0	84.6
\$1,000,000 and less than \$10,000,000.....	36.5	28.0	47.8	48.0
\$10,000,000 and over.....	5.2	3.6	43.2	36.6
Average per establishment.....			\$2,210,140	\$1,624,012

¹ Less than one-tenth of 1 per cent.

There is no other industry in which so many plants of great size are found. In 1909, 41.7 per cent of the establishments reported products valued at \$1,000,000 or more, as compared with 31.6 per cent in 1904. This group of establishments in 1909 included 23, and in 1904, 15 with products in excess of \$10,000,000 in value. The value of the output of the establishments with products valued at \$1,000,000 or over formed 91 per cent of the total for all establishments in 1909, as compared with 84.6 per cent in 1904, and that of the establishments with products valued at

\$10,000,000 or over constituted 43.2 per cent of the total in 1909, as compared with 36.6 per cent in 1904.

The average number of wage earners per establishment increased from 500 in 1904 to 538 in 1909, or 7.6 per cent; the average value of products, from \$1,624,000 to \$2,210,000, or 36.1 per cent; and the average value added by manufacture, from \$561,000 to \$736,000, or 31.2 per cent. The increase in average value of products per establishment may perhaps be due partly to increase in prices of commodities, but is by no means wholly due to that cause.

The distribution of establishments reported in 1909 by size groups is shown for Pennsylvania and Ohio, and for all other states combined, in Table 49.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.			
	United States.	Pennsylvania.	Ohio.	All other states.
Total	446	189	75	182
Less than \$100,000.....	59	16	8	35
\$100,000 and less than \$1,000,000.....	201	86	27	88
\$1,000,000 and less than \$10,000,000.....	163	76	34	53
\$10,000,000 and over.....	23	11	6	6
Per cent of total	100.0	100.0	100.0	100.0
Less than \$100,000.....	13.2	8.5	10.7	19.2
\$100,000 and less than \$1,000,000.....	45.1	45.5	36.0	48.4
\$1,000,000 and less than \$10,000,000.....	36.5	40.2	45.3	29.1
\$10,000,000 and over.....	5.2	5.8	8.0	3.3

A classification of the establishments for 15 of the leading states according to the number of wage earners employed is presented in the following table:

STATE.	STEEL WORKS AND ROLLING MILLS: 1909																	
	Total.		Establishments employing—															
			1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States.....	446	240,076	5	16	21	271	34	1,151	60	4,532	89	14,977	98	34,988	82	57,198	57	126,843
California.....	5	1,038	1	2					1	67	1	179	2	790				
Connecticut.....	5	2,352							1	60	2	307						
Delaware.....	5	710						1	40	1	75	3	595		1	782	1	1,203
Illinois.....	24	17,584					1	42	2	177	7	1,234	5	1,511	4	2,610	5	12,010
Indiana.....	17	12,255							2	189	3	466	1	400	8	5,213	3	5,987
Kentucky.....	7	2,372							1	55	2	336	3	1,190	1	791		
Massachusetts.....	9	3,115			2	26	2	49	2	254	2	254	2	554			1	2,232
Michigan.....	8	1,183					1	49	4	294	1	186	2	654				
Missouri.....	4	2,227											2	715	2	1,512		
New Jersey.....	16	4,671			1	6			4	277	5	845	3	1,027	2	1,435	1	1,031
New York.....	25	10,091	2	5	1	12	3	118	4	291	4	588	6	2,219	2	1,573	3	5,285
Ohio.....	75	38,586			5	66	5	157	7	534	17	2,867	17	6,780	16	12,149	8	18,033
Pennsylvania.....	189	126,911	1	4	5	65	12	438	25	1,894	34	5,772	40	13,847	42	28,855	30	76,036
West Virginia.....	16	5,060			1	13	1	44	2	164	3	489	7	2,537	1	650	1	1,163
Wisconsin.....	14	2,124	1	5	3	38	4	111	3	236	1	140			1	568	1	1,028

Establishments employing 1,000 wage earners or more in 1909 employed altogether 52.9 per cent of the total number of wage earners in the industry; in fact, 18.5 per cent of the total were in establishments employing over 4,000 each.

Table 51 gives the percentage which the number of wage earners in establishments of each group formed of the total number of wage earners in the industry.

CLASS.	Per cent of total number of wage earners in steel works and rolling mills: 1909
Total	100.0
Establishments employing:	
1 to 20 wage earners.....	0.1
21 to 50 wage earners.....	0.5
51 to 100 wage earners.....	1.9
101 to 250 wage earners.....	6.2
251 to 500 wage earners.....	14.6
501 to 1,000 wage earners.....	23.8
Over 1,000 wage earners.....	52.9
1,001 to 2,000 wage earners.....	19.1
2,001 to 4,000 wage earners.....	15.2
Over 4,000 wage earners.....	18.5

Expenses.—As stated in the Introduction, the census does not purport to furnish figures that can be used for determining the total cost of manufacture and, consequently, the profits. Facts of interest can, however, be brought out concerning the relative importance of the different classes of expense which make up the total. Table 52 shows, in percentages, for each census from 1889 to 1909, the distribution of the total expenses reported for the industry in the country as a whole among the four classes indicated, and a similar distribution for 15 states separately for 1909.

Labor is a materially more important factor in this branch of the industry than in the blast furnaces. In the steel works and rolling mills expenditures for services (salaries and wages) constituted, in 1909, 21.2 per cent of the total expenses reported, as compared with 8.6 per cent for the blast-furnace branch of the industry; and those for materials represented 73.9 per cent, as compared with 88.4 per cent for the blast furnaces.

In this connection it should be borne in mind that the cost of materials in the case of the steel works and

rolling mills involves much duplication, due to the sale or transfer of partially finished products from one plant in the industry to another. Were it not for this duplication the percentage of the total reported expenses represented by cost of materials would be much lower. In the case of blast furnaces, on the other hand, there is virtually no such duplication in cost of materials.

penses is due largely to the diversity in the character of products made and to differences among the states with respect to the amount of duplication in cost of materials.

During the 20 years covered by the table the percentage of the total reported expenses represented by wages fell from 24.2 to 18.3, while the proportion represented by materials rose from 70.4 per cent to 73.9 per cent and the proportions for other classes also advanced. These figures doubtless indicate approximately the actual changes in conditions, but it should be borne in mind that in all probability variations have taken place from census to census in the relative amount of duplication in cost of materials, which would tend to affect the significance of all the percentages.

Engines and power.—The amount of power used was first reported for the industry at the census of 1889, and Table 36 shows that the total horsepower increased from 535,430 in 1889 to 2,100,978 in 1909. Table 53 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current) and their total horsepower at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishment.

Table 52

STATE.	STEEL WORKS AND ROLLING MILLS: PER CENT OF TOTAL REPORTED EXPENSES REPRESENTED BY—			
	Salaries.	Wages.	Materials.	Miscellaneous expenses.
United States:				
1909.....	2.9	18.3	73.9	4.8
1904.....	2.9	19.8	71.3	6.0
1899.....	1.8	19.4	74.1	4.7
1889.....	1.6	24.2	70.4	3.8
Individual states: 1909:				
California.....	2.3	23.9	67.7	6.1
Connecticut.....	6.1	34.0	53.4	6.6
Delaware.....	5.6	25.2	64.1	5.1
Illinois.....	3.1	17.2	74.8	4.9
Indiana.....	3.0	22.7	70.7	3.6
Kentucky.....	1.4	17.6	76.8	4.2
Massachusetts.....	2.9	15.1	76.4	5.7
Michigan.....	5.0	25.7	62.1	7.2
Missouri.....	4.2	26.2	56.8	12.8
New Jersey.....	6.2	25.6	60.1	8.2
New York.....	3.7	18.2	74.7	3.3
Ohio.....	2.3	16.1	78.2	3.5
Pennsylvania.....	3.0	18.8	72.8	5.4
West Virginia.....	2.2	18.8	76.8	2.1
Wisconsin.....	2.3	14.2	79.8	3.6

The considerable variation among the states in the proportions represented by the several classes of ex-

Table 53

POWER.	STEEL WORKS AND ROLLING MILLS.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	8,244	6,359	5,562	2,100,978	1,649,299	1,100,801	100.0	100.0	100.0
Owned.....	6,033	5,858	5,562	2,042,066	1,635,081	1,099,667	97.2	99.1	99.9
Steam.....	5,865	5,746	5,441	1,955,346	1,610,612	1,086,897	93.1	97.7	98.7
Gas.....	118	53	16	79,391	11,806	1,543	3.8	0.7	0.1
Water wheels and motors.....	50	59	105	5,829	4,795	8,067	0.3	0.3	0.7
Other.....				1,500	7,868	3,160	0.1	0.5	0.3
Rented.....	2,211	501	(1)	58,912	14,218	1,134	2.8	0.9	0.1
Electric.....	2,211	501	(1)	58,797	6,798	877	2.8	0.4	0.1
Other.....				115	7,420	257	(2)	0.4	(2)
Electric motors.....	27,789	12,684	3,220	716,609	254,258	64,658	100.0	100.0	100.0
Run by current generated by establishment.....	25,558	12,183	3,220	657,812	247,460	63,781	91.8	97.3	98.6
Run by rented power.....	2,211	501	(1)	58,797	6,798	877	8.2	2.7	1.4

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power amounted to 1,100,801 horsepower in 1899 and 2,100,978 in 1909, an increase of 1,000,177 horsepower, or 90.9 per cent. Although the bulk of the increase was in steam power, yet the rate of increase in this form of power was very much lower than that for the power of gas and other internal combustion engines, or of electric motors operated by purchased current. The number of gas engines increased from 16, with an average of 96 horsepower per engine, in 1899, to 118, with an average horsepower of 673, in 1909. In a number of cases

where blast furnaces are operated in conjunction with steel works and rolling mills, blast-furnace gas is utilized in internal-combustion engines for the steel making and rolling departments as well as for the blast-furnace department (see p. 14). There has also been a great increase in the practice of applying primary power generated in the establishments by means of electric motors.

The increase in power from 1899 to 1909 was 90.9 per cent, as compared with an increase of only 77.5 per cent in tonnage of products. This difference, when

taken in connection with the fact that there was an increase of only 31 per cent in the number of wage earners, indicates that there has been a material extension in labor-saving equipment during the decade.

Table 54 shows for 1909 the amount of each of the several kinds of primary power, the horsepower of all electric motors, and the amount of the different kinds of fuel used in the industry in 15 leading states.

Table 54

STEEL WORKS AND ROLLING MILLS: 1909

STATE.	Number of establishments reporting.	Total horsepower.	Primary horsepower.						Electric horsepower.		Fuel used.						
			Owned by establishments reporting.					Rented.		Total rented and generated in the establishment reporting.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States ..	448	2,100,978	2,042,066	1,955,346	79,331	5,829	1,500	58,797	115	716,609	657,812	765,145	19,759,678	648,637	65,808	2,063,736	261,601,204
California	5	3,945	3,007	3,007	.....	.....	.....	938	.....	1,638	700	.....	384	3,402	68	123,604	.....
Connecticut	5	14,860	14,855	14,855	.....	.....	.....	5	.....	1,341	1,336	47,057	62,511	2,020	200	78,712	3,360
Delaware	5	4,912	4,912	4,912	.....	.....	.....	.....	.....	1,743	1,743	2,619	34,014	3,300	145	560	450
Illinois	24	152,470	150,260	138,260	12,000	.....	.....	2,210	.....	85,852	83,142	15,311	3,088,782	86,143	4,704	260,003	.....
Indiana	17	111,806	111,806	60,631	51,175	.....	.....	.....	.....	99,839	99,839	5	1,028,754	14,083	300	351,932	502,360
Kentucky	7	29,640	29,640	29,640	.....	.....	.....	.....	.....	1,288	1,288	.....	137,438	16,032	384	.....	1,876,647
Massachusetts	9	24,500	24,485	23,050	810	625	.....	.....	15	7,844	7,844	1,861	155,952	2,231	335	140,432	645
Michigan	8	4,290	4,065	4,065	.....	.....	.....	225	.....	1,503	1,278	.....	42,471	1,237	89	47,142	.....
Missouri	4	6,255	6,255	6,175	80	.....	.....	.....	.....	2,142	2,142	3	77,885	3,153	.....	142,482	7,750
New Jersey	16	29,699	29,684	28,949	.....	735	.....	15	.....	8,148	8,133	31,671	252,611	8,964	877	32,086	3,347
New York	25	136,456	106,766	99,904	5,912	950	.....	29,590	100	36,326	6,736	9,106	769,404	32,678	6,015	71,464	831,417
Ohio	75	515,813	505,042	504,186	856	.....	.....	10,771	.....	116,903	106,132	105	3,460,695	136,964	10,030	73,275	64,620,688
Pennsylvania	189	896,440	882,270	872,746	8,005	419	1,100	14,170	.....	325,109	310,939	650,587	9,447,159	238,459	25,204	520,604	189,133,915
West Virginia	16	46,508	46,508	46,508	.....	.....	.....	.....	.....	3,638	3,638	.....	275,223	24,650	240	.....	3,704,375
Wisconsin	14	10,064	9,810	9,385	25	.....	400	254	.....	1,812	1,558	158	117,043	3,171	112	48,942	.....
All other states	27	113,320	112,701	109,073	528	3,100	.....	619	.....	21,983	21,364	6,662	809,352	72,150	7,106	171,498	915,750

Fuel consumed in the industry.—Bituminous coal is the principal kind of fuel used, 19,759,678 tons being consumed during 1909. The gas reported includes 174,104,855 thousand cubic feet of blast-furnace gas consumed in steel works and rolling mills, the remainder being chiefly, if not entirely, natural gas. The quantity of blast-furnace gas consumed in steel

works and rolling mills was reported only in Ohio and Pennsylvania, the former reporting 54,707,000 thousand cubic feet and the latter 119,397,000. Most of the natural gas was also used in these two states.

The expenditure for fuel and rent of power in 1909 amounted to \$46,136,725. Such expenditures are shown by states in Table 89.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

MATERIALS.

Table 55 shows the statistics for the chief classes of materials reported by the steel works and rolling mills for 1909, 1904, and 1899. Detailed statistics, by states, for 1909, are given in Table 87.

The data for the several classes of materials do not include materials produced and consumed in the same establishment; consequently, except in the case of pig iron, ferroalloys, and iron ore they by no means represent the total consumption. On the other hand, there is much duplication in the total cost of materials, due to the fact that the product of one plant is often sold or transferred to another plant for further manufacture. The pig iron reported represents the total consumption, the blast-furnace departments of steel works having been treated as separate establishments. The ingots, blooms, billets, slabs, muck and scrap bar, and sheet and tin-plate bars represent steel and partly rolled material acquired by the reporting establishments from outside sources for further hot rolling, including material received by transfer

from other plants owned by the same company. In some rolling mills finished hot-rolled products are subjected to further processes of manufacture, and the cost of such rolled forms acquired from outside sources, with the exception of skelp and wire rods, which are reported separately, is included under "all other materials."

It is evident that the quantities of the partly rolled products and of the finished rolled forms reported as used as materials by establishments in the industry may vary from census to census merely because of changes in the relationship of plants and the methods of conducting business, so that the changes in the consumption of these materials shown in the table have little significance as indicating the extent of the growth of the industry.

The consumption of pig iron increased 6,885,661 tons, or 56.5 per cent, during the period 1904-1909, the increase during the decade 1899-1909 being 83.3 per cent, as compared with 78 per cent and 147.6 per cent, respectively, for the two preceding decades.

Table 55

MATERIAL.	STEEL WORKS AND ROLLING MILLS— MATERIALS USED.				Per cent of Increase. ¹	
	1909	1904	1899	1904- 1909	1899- 1904	
	Total cost	\$657,500,856	\$441,204,432	\$390,895,277	49.0	12.9
Iron and steel:						
For furnaces and hot rolls—						
Pig iron, including ferroal-						
loys—						
Tons.....	19,076,889	12,191,228	10,411,281	56.5	17.1	
Cost.....	\$297,471,122	\$172,101,436	\$151,064,348	72.8	13.9	
Pig iron—						
Tons.....	18,712,304	(²)	(²)			
Cost.....	\$282,663,740	(²)	(²)			
Ferroalloys—spiegeleisen, ferromanganese, etc.—						
Tons.....	364,585	(²)	(²)			
Cost.....	\$14,807,382	(²)	(²)			
Scrap from outside sources, including old rails not intended for re-rolling—						
Tons.....	4,803,617	5,124,277	4,126,980	-6.3	24.2	
Cost.....	\$72,722,831	\$67,601,248	\$66,852,621	7.6	1.1	
Ingots, blooms, billets, slabs, muck and scrap bar, rails for re-rolling, and sheet and tin-plate bars (from outside sources)—						
Tons.....	6,508,249	4,920,177	3,876,456	32.3	26.9	
Cost.....	\$145,575,635	\$110,268,828	\$97,809,926	32.0	12.7	
Rolled forms for further manu- facture (from outside sources)—						
Skelp—						
Tons.....	176,717	259,643	(²)	-31.9		
Cost.....	\$5,704,856	\$7,331,935	(²)	-22.2		
Wire rods—						
Tons.....	146,425	161,914	136,725	-9.6	18.4	
Cost.....	\$4,252,696	\$4,774,383	\$5,419,617	-10.9	-11.9	
Iron ore:						
Tons.....	835,338	549,995	346,310	51.9	58.8	
Cost.....	\$4,292,963	\$2,396,792	\$1,348,809	79.1	77.7	
Fuel and rent of power.....	\$46,136,725	\$35,386,666	\$22,463,209	30.4	57.5	
All other materials.....	\$81,344,029	\$41,343,144	\$45,936,747	96.8	-10.0	

¹ A minus sign (-) denotes decrease. ² Not reported separately.

As is indicated by Table 56, the greater part of the pig iron used as material in steel works and rolling mills is produced in blast furnaces owned by the companies consuming.

Table 56

MATERIAL AND SOURCE.	STEEL WORKS AND ROLLING MILLS: 1909			
	United States.	Pennsylvania.	Ohio.	All other states.
PIG IRON CONSUMED (TONS).				
All pig iron	19,076,889	9,317,903	4,209,149	5,549,837
Produced by companies con- suming.....	15,252,736	7,274,901	3,182,915	4,794,920
Purchased.....	3,824,153	2,043,002	1,026,234	754,917
Pig iron, not including ferroalloys... Produced by companies con- suming.....	18,712,304	9,158,260	4,172,114	5,381,930
Purchased.....	15,108,244	7,197,182	3,172,453	4,738,609
Ferroalloys—spiegeleisen, ferroman- gane, etc.....	364,585	159,643	37,035	167,907
Produced by companies con- suming.....	144,492	77,719	10,462	56,311
Purchased.....	220,093	81,924	26,573	111,596
PER CENT OF TOTAL.				
All pig iron	100.0	100.0	100.0	100.0
Produced by companies con- suming.....	80.0	78.1	75.6	86.4
Purchased.....	20.0	21.9	24.4	13.6
Pig iron, not including ferroalloys... Produced by companies con- suming.....	100.0	100.0	100.0	100.0
Purchased.....	80.7	78.6	76.0	88.0
Ferroalloys—spiegeleisen, ferroman- gane, etc.....	100.0	100.0	100.0	100.0
Produced by companies con- suming.....	39.6	48.7	28.2	33.5
Purchased.....	60.4	51.3	71.8	66.5

The scrap iron and steel reported in Table 55 is only that acquired from outside sources. The quantity of scrap made and consumed in the works where made exceeds somewhat the quantity acquired from outside sources. Table 57 gives the statistics for all scrap consumed.

Table 57

SOURCE.	SCRAP IRON AND STEEL CONSUMED (TONS): 1909			
	United States.	Pennsylvania.	Ohio.	All other states.
Total	9,929,710	5,723,608	1,402,722	2,803,480
Procured from outside sources.....	4,803,617	2,669,773	530,408	1,603,436
Purchased.....	4,029,774	2,053,354	461,483	1,514,937
Produced in other works of companies reporting.....	773,843	616,419	68,925	88,499
Produced in works where con- sumed.....	5,126,093	3,053,735	872,314	1,200,044

Of the consumption of 6,508,249 tons of ingots and partially rolled material acquired from outside sources in 1909, as shown in Table 55, 3,427,577 tons represented purchases from unaffiliated concerns and 3,080,672 tons transfers from other plants controlled by the company reporting.

Of the skelp from outside sources used in 1909, 141,496 tons were purchased and 35,221 tons were transferred from other plants of the company reporting. Besides this, 1,401,573 tons of skelp were consumed in further manufacture in rolling mills where produced, making a total of 1,578,290 tons consumed in rolling-mill establishments in the manufacture of wrought-welded pipe and tubes. This is a much larger consumption of skelp than that in pipe-manufacturing concerns independent of rolling mills.

The 146,425 tons of wire rods reported under "materials" for 1909 include 18,134 tons purchased and 128,291 tons transferred from other plants of the companies reporting. In addition, wire departments of the rolling mills consumed 1,318,796 tons of wire rods made in the same establishments, making a total of 1,465,221 tons of wire rods used in the manufacture of wire in connection with iron and steel rolling mills. This is not, of course, the total consumption of wire rods, as many are used by concerns in the wire industry proper—that is, by wire plants independent of rolling mills.

The statistics given in the foregoing paragraph relate to iron and steel products only. Considerable copper is handled by the iron and steel mills, the quantity consumed in 1909 (included under "all other materials" in Table 55) being 19,545 tons (21,890 short tons) and the cost \$5,756,018.

The statistics do not show the cost of the different kinds of fuel, but the total expenditure for fuel and rent of power in 1909 was \$46,136,725, or 7 per cent of the total cost of materials, as compared with 8 per cent in 1904, and 5.7 per cent in 1899.

PRODUCTS.

Summary of products.—Table 58 shows the total value of products of steel works and rolling mills and

The value of products as reported by steel works and rolling mills in 1909 totaled \$985,722,534, an increase of \$311,757,508, or 46.3 per cent, over that in 1904, and of \$388,510,818, or 65.1 per cent, over that in 1899.

As already stated, the duplication in the total value of products at different censuses may have varied in relative amount, so that the increases shown do not necessarily indicate accurately the true movement of production as measured in terms of money.

The great bulk of the output of steel works and rolling mills consists of products of Group I designated in the table as "rolled, forged, and other classified iron and steel products." The combined reports of the several plants regarding the output of these products for sale or transfer to other works showed in 1909 a total of 26,723,274 tons, valued at \$863,342,711. These totals, however, have very little significance, as they involve much duplication, due to the sale or transfer of partly rolled products or of unrolled steel from one plant to another. The most feasible way to measure the volume of output of the steel works and rolling mills is by considering the total production of products at different stages, regardless of the question whether the products are sold or transferred, or consumed in the industry itself. Statistics as to the total output of unrolled steel and of certain partly finished rolled products are presented in subsequent tables.

The figures given in the table as to the total output of finished rolled products and forgings (subgroup A) are substantially free from duplication. The quantity reported in 1909 by establishments assigned to the steel-works and rolling-mill industry was 19,276,237 tons, and the value \$667,393,177.

Some of the completely rolled products produced by rolling mills are subjected to further processes of manufacture in the same establishments. In other words, many rolling-mill concerns do not confine their business to the rolling of iron and steel proper, but make more advanced products similar to those made by establishments in other industries which buy their material from the rolling mills. Under the heading of "finished rolled products and forgings," however, in Table 58 are shown the total quantity and value of each class of rolled products, whether sold or transferred to other works, on the one hand, or consumed in further processes of manufacture in the works where produced, on the other hand. Duplication in total value of products is avoided in the latter case by including in Group III in the table ("all other iron and steel products") only the value added to such rolled material by further processes of manufacture in the works, and not the total value of the products as turned out. The values assigned to the rolling-mill products thus used in further processes of manufacture in the same works were calculated in the Census Bureau on the basis of average values as computed from the reports of representative establishments.

Partly finished rolled products are those which are ordinarily subjected to further rolling by hot rolls. The class includes blooms, billets, slabs, sheet and tin-plate bars, and muck and scrap bar. All finished rolled products, except shapes rolled direct from the ingot, pass through one or another of these intermediate forms. The greater part of these intermediate products, however, are not sold but are rolled into finished forms in the same works. Only the output made for sale or for transfer to other works of the producing company is shown in the table, so that there is no duplication in the figures for any given plant, although the greater part of the value of this group of products represents duplication in cost of materials and value of products for the industry taken as a whole. That this is true is shown by the fact that the tonnage of ingots, blooms, billets, slabs, etc., reported in Table 55 as material acquired by purchase or by transfer from other plants of the same company for rolling (which, however, includes some rails for rerolling) was equal to 93.7 per cent in 1909, 95.2 per cent in 1904, and 86.5 per cent in 1899, of the tonnage of ingots and unfinished rolled products shown in Table 58 as produced for sale or for transfer to other works of the same company. In other words, 93.7 per cent of such unfinished products were in 1909 consumed as materials in other plants in the industry, with the result that their value appears a second time in the total value of products of the industry.

Unrolled steel and castings include ingots and direct steel castings. Ingots are nearly all subjected to rolling processes in the same works, and the table only includes the small amount sold or transferred to other works. The total production of steel castings, whether made for sale or for consumption in the establishments reporting, is shown in the table, but the quantity consumed in the same establishments was small.

Decided differences appear among the several classes of finished rolled products and forgings with respect to the rate of increase in tonnage and value from census to census. Wire rods show a higher rate of increase in tonnage between 1899 and 1909 than any other of the rolled products (150.4 per cent), followed by structural shapes (147.8 per cent), plates and sheets (124 per cent), and skelp, hoops, bands, and cotton ties (102.9 per cent). The increases in the production of black plates, bars and rods, and rails, though considerable, are much less marked. The output of nail and tack plates decreased, owing to the decline in the cut-nail industry.

The changes in the output, for sale or transfer, of partly rolled products and of ingots are much affected by changes in the relationships of plants and in the method of conducting the steel industry; the total product differs very greatly from the amount for sale or transfer.

Table 59 shows, by percentages, the distribution of the total tonnage of "finished rolled products and forgings" among the several classes at each of the last three censuses.

Table 59

PRODUCT.	STEEL WORKS AND ROLLING MILLS—PER CENT OF TOTAL TONNAGE OF FINISHED ROLLED PRODUCTS AND FORGINGS.		
	1909	1904	1899
Finished rolled products and forgings	100.0	100.0	100.0
Bars and rods	19.6	19.1	24.0
Plates and sheets, not including those for tinning, nail and tack plates, tie-plates, fishplates, or armor plates..	17.3	14.5	14.3
Rails	14.8	17.2	21.6
Wire rods	11.9	14.1	8.8
Structural shapes	11.0	7.5	8.2
Skelp	10.8	12.2	11.5
Hoops, bands, and cotton ties	1.8	2.6	3.8
Black plates or sheets for tinning	3.3	3.9	7.7
All other	8.5	8.9	

The percentages of the total represented by the several products in 1909 differed considerably from those of 10 years before, reflecting the decided differences in the percentages of increase in these products as shown in Table 58.

Average values.—Table 60 shows average values per ton for the principal classes of products specified in Table 58.

Table 60

PRODUCT.	STEEL WORKS AND ROLLING MILLS—AVERAGE VALUE PER TON.		
	1909	1904	1899
Finished rolled products and forgings:			
Bars and rods	\$32.10	\$34.41	\$40.35
Plates and sheets	39.99	41.91	45.77
Rails	28.38	26.55	20.67
Wire rods	26.99	29.56	38.76
Structural shapes	30.87	34.29	34.26
Skelp	30.95	30.03	41.13
Hoops, bands, and cotton ties	30.58	37.84	53.22
Black plates or sheets for tinning	49.02	50.19	
Partly finished rolled products:			
Blooms, billets, and slabs, rolled forging blooms and billets, and sheet and tin-plate bars	22.42	22.72	23.08
Muck and scrap bar	28.57	26.11	29.17
Unrolled steel:			
Ingots	25.18	20.29	26.82
Direct steel castings	76.98	71.70	82.47

It should be borne in mind that these averages in the case of products transferred to other works of the same concern and products consumed in the same works involve values assigned by the producer or computed on the basis of reports of representative establishments, and may be more or less arbitrary. This condition affects somewhat the comparability of the averages from census to census. The comparability is still more affected by the fact that each class of products includes a considerable variety of individual commodities, sizes, shapes, etc. The values per ton of the different individual products included in each class often differ considerably from one another, and the proportion which these individual products represent of the total may vary considerably from one census to another. Even for such a commodity as rails, it is impossible to draw definite conclusions regarding the movement of prices from averages based on the total production, as there are considerable variations in prices as between different kinds of rails. Thus the rail product of 1909 includes a larger tonnage of alloy steel rails of high value per ton than was included in the production reported at the two preceding censuses. Nevertheless, the figures in Table

60 doubtless reflect in a rough way the movement of market prices.

It is obvious that the same conditions which affect the comparability of the average values of products from census to census also affect the comparability of the percentages of increase in tonnage with those in value, as shown in Table 58.

Kinds of steel used in leading products.—Table 58 distinguishes between the production of rails and of structural shapes from open-hearth steel and that from Bessemer steel. It is noteworthy that between 1904 and 1909 there was an absolute decrease in the production of rails and structural shapes of Bessemer steel, as against a very great increase in the production of those made from open-hearth steel. In 1904 Bessemer rails were made by 12 establishments and open-hearth by 5, while in 1909, 8 produced Bessemer rails and 11 open-hearth. In both years some establishments rolled both kinds of rails.

Production of finished rolled products and forgings, by states.—The distribution of the 19,276,237 tons of finished rolled products and forgings made by steel works and rolling mills in 1909 among the principal producing states is shown in Table 61, together with comparative figures for 1904. It may be noted that a similar distribution of the total tonnage, including that of unfinished rolled products and unrolled steel made for sale or transfer to other works, would have little significance because of the variations among the states in the amount of duplication and of the fact that partly finished products made in one state are often transferred to other states for further manufacture in the rolling mills there.

Table 61

STATE.	STEEL WORKS AND ROLLING MILLS—FINISHED ROLLED PRODUCTS AND FORGINGS.			
	Quantity (tons).		Per cent of total.	
	1909	1904	1909	1904
United States	19,276,237	12,759,993	100.0	100.0
Pennsylvania	9,903,162	6,923,608	51.4	54.3
Ohio	3,097,423	1,659,272	16.1	13.0
Illinois	2,086,120	1,301,870	10.8	10.2
Indiana	965,174	407,156	5.0	3.2
New York	798,225	533,726	4.1	4.2
West Virginia	437,388	288,793	2.3	2.3
Colorado				
Maryland				
Alabama	925,005	651,737	4.8	5.1
Wisconsin				
Massachusetts	250,226	189,269	1.3	1.5
New Jersey	150,613	143,320	0.8	1.1
Kentucky	137,679	149,724	0.7	1.2
Missouri	127,851	143,666	0.7	1.1
Connecticut	83,990	63,123	0.4	0.5
California	66,586	77,448	0.3	0.6
All other states	50,931	30,466	0.3	0.2
	185,861	196,915	1.0	1.5

Pennsylvania produced 51.4 per cent of the total output of these products in 1909, as compared with 54.3 per cent in 1904. Ohio increased its proportion of the output from 13 per cent in the earlier to 16.1 per cent in the later year. Indiana and Illinois showed higher percentages of the total output in 1909 than in 1904; but the proportions reported by New York and West Virginia remained approximately the same.

The table shows that, of the total output of finished rolled products and forgings in 1909, 21 per cent was produced for use in the same works and 6.3 per cent for transfer to other works of the same company, leaving 72.8 per cent for sale.

A very large proportion of the output of skelp, black plates, and wire rods, and a very considerable proportion of some of the other products listed, were, in 1909, used in the works producing them or transferred for further manufacture to other works of the same company. It should be noted that while most of the black plates or sheets are shown as produced for transfer to other works of the same company, this results from the fact that, in order to distinguish the tin-plate

industry as a separate industry, the tinning departments of rolling-mill establishments are treated as separate plants, even though directly connected with the rolling mills.

Total production and disposition of unrolled and partly rolled products.—Table 58, as already stated, shows, with reference to unrolled and partly rolled products, only the quantity produced for sale or for transfer to other plants of the same concern. Table 64 shows for 1909 the total production of the specified intermediate products, the quantity produced for consumption in the same works, the quantity produced for transfer to other works of the same company, and that produced for sale.

PRODUCT.	STEEL WORKS AND ROLLING MILLS—PARTLY FINISHED PRODUCTS: 1909									
	Total.		For consumption in works where produced.		For transfer or sale.					
					Total (shown in Table 58).		For transfer to other works of same company.		For sale.	
	Tonnage.	Value.	Tonnage.	Value.	Tonnage.	Value.	Tonnage.	Value.	Tonnage.	Value.
Partly finished rolled products	10,885,137	\$443,312,206	13,085,701	\$289,818,846	8,799,438	\$153,493,360	3,093,395	\$68,523,401	3,706,041	\$68,664,859
Blooms, billets, and slabs.....	16,263,418	353,091,220	11,375,622	244,576,473	4,887,796	108,514,747	3,045,977	65,492,759	1,841,819	43,021,988
Rolled forging blooms.....	160,997	4,237,364	76,614	2,040,231	84,363	2,247,133	.....	.....	84,383	2,247,133
Sheet and tin-plate bars.....	2,094,398	47,814,593	441,637	10,069,324	1,652,761	37,745,269	27,353	639,400	1,625,408	37,105,859
Muck and scrap bar.....	1,366,324	38,119,029	1,191,828	33,132,818	174,496	4,986,211	20,065	696,242	154,431	4,289,969
Unrolled steel.....	23,473,718	478,738,988	22,833,167	440,443,068	1,590,551	1,38,293,920	112,301	2,080,281	478,250	38,213,638
Ingot.....	22,968,862	439,874,540	22,826,117	436,280,814	142,745	3,593,726	112,301	2,080,281	30,444	1,513,445
Direct castings.....	504,856	38,862,448	57,050	4,162,254	1,447,806	1,34,700,194	.....	.....	447,806	34,700,194

¹ Exclusive of 57,050 tons, valued at \$4,162,254, consumed in the works where produced, which are included in Table 58.

It will be seen that the total amount of some of these classes of products is very much greater than that intended for sale or transfer, the great bulk being subjected to further processes in the producing works.

Total production and disposition of scrap.—The scrap steel and iron reported in Table 58 is only that which was sold or transferred to other plants of the same company. The greater portion of the scrap produced is consumed in the furnaces of the producing plants. Table 65 shows the total production and the disposition made thereof in 1909.

DISPOSITION.	STEEL WORKS AND ROLLING MILLS—SCRAP IRON AND STEEL PRODUCTS: 1909		
	Quantity.		Value.
	Tons.	Per cent of total.	
Total production.....	8,364,647	100.0	\$89,388,138
For consumption in works where produced.....	5,126,093	80.5	71,222,512
For transfer or sale (as shown in Table 58).....	1,238,554	19.5	18,163,624
For transfer to other works of same company..	398,436	6.3	5,530,852
For sale.....	840,118	13.2	12,632,772

Summary as to disposition of products and quantity and value of products in condition in which marketed.—It has already been shown that of the finished rolled products and forgings, the total quantity and value of which are included in Group I in Table 58, considerable quantities undergo further processes of manufacture in the same works. It has also been stated that the table mentioned does not show the total value of such more highly elaborated products in Group III, but only the value added to the rolling-mill products by further manufacture. It is desirable, therefore, to show the quantity and value of all products of the industry in the condition in which sold.

In Table 66 the total value of the products in the condition in which sold (\$864,247,792) contains no duplication due to the use of one product as material for further manufacture in the same plant or in another plant controlled by the same company; but it is impossible to avoid the duplication where the partly finished product of one plant is used as material by another plant in the industry not controlled by the same concern. This duplication, however, is not very great.

Table 66

PRODUCT.	STEEL WORKS AND ROLLING MILLS—PRODUCTS: 1909							
	Total.		For consumption in works where produced.		For transfer to other works of same company.		Products in form and condition for sale.	
	Tonnage.	Value.	Tonnage.	Value.	Tonnage.	Value.	Tonnage.	Value.
							Amount.	Per cent of total.
Total							\$864,247,782	100.0
Unrolled steel.....	23,473,718	\$478,736,988	22,883,167	\$440,443,068	112,301	2,080,281	36,213,639	4.2
Partly finished rolled products.....	19,885,137	443,312,206	13,085,701	289,818,846	3,093,395	66,828,401	85,664,959	10.0
Finished rolled products and forgings.....	19,276,237	667,393,177	4,045,272	128,360,958	1,206,415	47,035,208	491,997,011	56.9
Manufactures from rolling-mill products.....		213,537,183					213,537,183	24.7
Scrap steel and iron.....	6,364,647	89,386,136	5,126,093	71,222,512	398,436	5,530,852	12,632,772	1.5
Castings other than direct steel castings.....		128,670					5,520,398	0.6
Products other than steel and iron, and custom work and repairing.....		17,681,830					17,681,830	2.0

Manufactures from iron and steel rolling-mill products made in rolling mills.—The quantity and value of the principal products made in rolling-mill establishments from iron and steel rolled products and forgings, and the percentages of increase, are given in Table 67 for 1909 and 1904. Similar products made by establishments assigned to industries other than the rolling-mill industry are not here included. As already stated the tin-plate dipping departments of rolling mills are treated as belonging to a separate industry.

Table 67

PRODUCT.	MANUFACTURES FROM IRON AND STEEL ROLLING MILL PRODUCTS MADE IN ROLLING-MILL ESTABLISHMENTS.		
	1909	1904	Per cent of increase. ¹
Total value	\$213,537,183	\$139,241,015	(²)
Wire and wire products:			
Tons (2,000 pounds).....	1,634,855	1,416,484	15.4
Value.....	\$71,624,024	\$67,551,443	6.0
Pipe and tubes:			
Wrought-welded—			
Tons.....	1,314,771	849,047	54.9
Value.....	\$68,471,573	\$43,985,728	55.7
Seamless—hot-rolled or drawn—			
Tons.....	54,273	20,636	243.1
Value.....	\$5,650,739	\$2,290,234	189.8
All other, not cast—			
Tons.....	17,561		
Value.....	\$986,699		
Bolts, nuts, rivets, forged spikes, washers, etc.:			
Kegs (200 pounds).....	4,471,985	3,105,827	44.0
Value.....	\$20,538,858	\$13,854,635	48.2
Cut nails and spikes:			
Kegs (100 pounds).....	1,009,319	1,311,549	-23.0
Value.....	\$2,218,207	\$2,394,108	-7.3
Horse and mule shoes:			
Kegs (200 pounds).....	996,383	768,253	29.7
Value.....	\$7,202,897	\$5,483,137	31.4
Springs—car, furniture, and all other, not including wire springs:			
Tons.....	6,191	22,022	-71.9
Value.....	\$374,924	\$1,708,632	-78.1
Galvanized plates or sheets:			
Tons.....	431,658	(³)	
Value.....	\$25,912,056	(³)	
Stamped ware:			
Tons.....	24,612	(³)	
Value.....	\$2,296,707	\$292,923	684.1
Shovels, spades, scoops, etc.....	\$540,321	\$410,500	31.6
Steel cars, machinery, switches, frogs, etc.....	\$7,720,178	\$1,269,675	(²)

¹ A minus sign (—) denotes decrease. ² Not comparable. ³ Not reported.

The number of establishments reporting the chief of these more advanced products in 1909 is given in Table 68. Some establishments make no such products while some make two or more kinds.

Table 68

	Number of establishments: 1909
All steel works and rolling mills	446
Establishments reporting the manufacture of—	
Wire and wire products.....	23
Pipe and tubes—	
Wrought-welded.....	15
Seamless—hot rolled or drawn.....	4
Bolts, nuts, rivets, forged spikes, washers, etc.....	35
Cut nails and spikes.....	12
Horse and mule shoes.....	11
Springs—car, furniture, and all other, not including wire springs.....	6
Galvanized plates and sheets.....	23
Stamped ware.....	7
Shovels, spades, scoops, etc.....	4

Wire and wire products made in rolling mills.—Wire rods were rolled by 29 establishments in the industry “iron and steel, steel works and rolling mills” in 1909, and of these 23 drew wire. Of these 23 establishments 16 reported the manufacture of wire nails or spikes, 13 that of woven-wire products, and 19 that of other wire goods. Table 69 gives the tonnage and value of the wire products of rolling mills for the years 1909, 1904, and 1899; similar products made by establishments in other industries are not included.

Table 69

PRODUCT.	IRON AND STEEL WIRE AND WIRE PRODUCTS MADE IN STEEL WORKS AND ROLLING MILLS. ¹			Per cent of increase.	
	1909	1904	1899	1904-1909	1899-1904
	Total:				
Tons (2,000 pounds).....	1,634,855	1,416,484	878,296	15.4	61.1
Value.....	\$71,624,024	\$67,551,443	\$47,728,784	6.0	41.6
Wire drawn for sale, plain or coated:					
Tons.....	478,789	963,419	649,146	15.8	48.4
Value.....	\$19,774,056	\$50,056,081	\$35,283,688	2.7	41.9
Wire manufactures, not including nails and spikes:					
Tons.....	637,211				
Value.....	\$31,616,241				
Wire nails and spikes:					
Tons ²	518,855	453,075	230,150	14.5	96.9
Value.....	\$20,233,727	\$17,495,362	\$12,445,096	15.7	40.6

¹ See report on wire, Part V of this report, for total wire production. ² Reported in kegs of 100 pounds: 1909, 10,377,108; 1904, 9,061,512; 1899, 4,603,000.

Nails and spikes constituted 31.7 per cent of the tonnage of wire and wire products in 1909, 32 per cent

in 1904, and 26.2 per cent in 1899. Reference should be made to Part V, which relates to the wire industry, for the total wire production.

Combined production of certain products in rolling mills and in other establishments.—In addition to the products derived from rolled material which are made in rolling-mill establishments and covered by Table 67, large quantities of the same classes of products are made in establishments which do not have rolling-mill facilities but purchase rolled material. For some of these classes of products detailed returns relative to quantity and value were obtained from the producing

establishments and for some other classes estimates were made. Table 70 shows the reported or estimated amount and value of these various classes of products for establishments other than rolling mills and for rolling-mill establishments, respectively, and the total for all establishments. In stating the number of establishments not rolling mills making each class of articles, only those which made such articles as their chief product are included, but the quantities and values given include the product—small in the aggregate—of establishments engaged primarily in other industries but which make the specified commodities incidentally.

Table 70

PRODUCT.	LEADING PRODUCTS DERIVED FROM ROLLED MATERIAL.						
	Total.			Made in rolling-mill establishments.		Made in other establishments.	
	1909	1904	Per cent of increase. ¹	1909	1904	1909	1904
Wrought-welded pipe or tubes:							
Establishments reporting.....	21	27	-22.2	15	14	6	13
Tons.....	1,739,771	1,149,047	51.4	1,314,771	849,047	² 425,000	² 300,000
Value.....	\$90,621,573	\$59,527,178	52.2	\$68,471,573	\$43,985,728	³ \$22,150,000	³ \$15,541,450
Bolts, nuts, rivets, forged spikes, washers, etc.:							
Establishments reporting.....	143	118	21.2	35	30	108	88
Kegs (200 pounds).....	9,889,985	6,305,827	56.8	4,471,985	3,105,827	² 5,418,000	² 3,200,000
Value.....	\$45,406,212	\$28,138,607	61.4	\$20,538,858	\$13,854,635	⁴ \$24,867,354	⁴ \$14,283,972
Cut nails and spikes:							
Establishments reporting.....	16			12	17	4	(⁵)
Kegs (100 pounds).....	1,036,089	1,470,149	-29.5	1,009,319	1,311,549	² 26,770	² 158,600
Value.....	\$2,274,955	\$2,684,449	-15.3	\$2,218,207	\$2,394,108	\$56,748	\$290,341
Wire nails and spikes:							
Establishments reporting.....	36			16	21	20	(⁵)
Kegs (100 pounds).....	13,926,861	12,587,512	10.6	10,377,108	9,061,512	3,549,753	3,526,000
Value.....	\$27,575,774	\$24,300,351	13.5	\$20,233,727	\$17,495,362	\$7,342,047	\$6,804,989
Horse and mule shoes:							
Establishments reporting.....	30	19	57.9	11	11	19	8
Kegs (200 pounds).....	1,137,333	880,253	29.2	996,383	768,253	² 141,000	² 112,000
Value.....	\$8,223,304	\$6,282,118	30.9	\$7,202,897	\$5,483,137	⁴ \$1,020,407	⁴ \$798,981
Springs, not including wire springs:							
Establishments reporting.....	60	61	-1.6	6	9	54	52
Tons.....	6,191	22,022		6,191	22,022		
Value.....	\$9,090,778	\$7,449,468	22.0	\$374,924	\$1,708,632	⁴ \$8,715,854	⁴ \$5,740,836
Galvanized plates and sheets:							
Establishments reporting.....	68			22	(⁵)	46	36
Tons.....				431,658	(⁵)	(⁵)	(⁵)
Value.....	\$33,345,483			\$25,912,056	(⁵)	⁴ \$7,433,427	⁴ \$6,418,850

¹ A minus sign (-) denotes decrease.

² Estimated on basis of average unit value for rolling-mill product.

³ Estimated from reports of establishments purchasing skelp.

⁴ Value of all products of establishments manufacturing the articles named as chief product, including, for 1909, by-products from other establishments and excluding specific products other than the articles named.

⁵ Figures not available.

⁶ Not reported.

The above table includes only classes of products of which a large proportion is made in rolling-mill establishments. A much larger proportion of each of the other classes of products covered by Table 67 is made by other establishments than by rolling-mill establishments, and the statistics regarding the total output of these products scarcely belong in a discussion of the general iron and steel industry.

Copper rods.—Four of the iron and steel rolling mills reported the rolling in 1909 of 17,809 short tons of copper rods, valued at \$4,824,443; of these rods, 765 tons were for sale and 17,044 tons for further manufacture in the wire-drawing departments of the mills.

Products sold for export.—Table 71 gives the quantity of each of the chief products reported by the roll-

ing mills as sold direct for export in 1909, the percentage of the total output represented by each, and the number of establishments reporting such sale for export. Doubtless certain additional quantities of the same classes of rolling-mill products are exported by others who buy them in the domestic market.

Of the finished rolling-mill products not subjected to further manufacture in the mills, rails show the largest proportion exported—11.11 per cent. For galvanized plates or sheets the exports equaled 18.36 per cent of the rolling-mill production. The quantities of wrought-welded pipe and tubes and of sheet and tin-plate bars exported are relatively large, constituting 6.19 per cent and 5.15 per cent, respectively, of the product made for sale by the rolling mills.

Table 71

PRODUCT.	STEEL WORKS AND ROLLING MILLS—PRODUCTS SOLD FOR EXPORT: 1909			PRODUCT.	STEEL WORKS AND ROLLING MILLS—PRODUCTS SOLD FOR EXPORT: 1909		
	Number of establishments reporting.	Tonnage.	Per cent of total production. ¹		Number of establishments reporting.	Tonnage.	Per cent of total production. ¹
Rails.....	10	317,455	11.11	Blooms, billets, and slabs.....	6	18,021	0.37
Rerolled or renewed rails.....	2	3,674	3.45	Sheet and tin-plate bars.....	3	85,123	5.15
Rail fastenings.....	9	20,118	5.07	Galvanized plates or sheets.....	5	79,246	18.36
Structural shapes.....	11	69,764	3.29	Bolts, nuts, rivets, forged spikes, washers, etc.....	4	26,743	1.69
Bars or rods and bars for reinforced concrete, not including wire rods.....	21	50,621	1.27	Cut nails and cut spikes.....	3	1,705	3.78
Wire rods.....	9	18,738	0.82	Pipe and tubes, wrought-welded.....	10	89,377	6.80
Plates and sheets, not including black plates or sheets for tinning, nail and tack plates, tie-plates, fishplates, or armor plates.....	36	80,706	2.42	Nail and tack plates, axles, rolled or forged steel car and locomotive wheels, armor plates, gun forgings and ordnance, horse and mule shoes, and springs.....	8	3,488	0.88
Skelp.....	5	10,703	0.51	Rolled, forged, cast, or other iron and steel products not enumerated.....	22	7,713	.....
Hoops, bands, and cotton ties.....	3	4,451	1.31				

¹ Based on the rolling-mill production, as given in Table 58 or Table 70, and not on the total production, which includes that consumed in the works reporting and that made in "other establishments."
² Reported as 75,516 kegs of 200 pounds.
³ Reported as 38,193 kegs of 100 pounds.

STEEL PRODUCTION.

Summary.—Table 72 gives the production of the different kinds of steel for the census years 1879 to 1909, inclusive. It includes steel made for use as material in the same works as well as that for sale or transfer. Moreover, it includes the small amount of steel made in establishments engaged in shipbuilding, the manufacture of cutlery, the manufacture of electrical machinery, and other industries, as well as in

the steel works proper. There has been during each decade a marked increase in both the absolute and the relative amount of open-hearth steel produced. Basic open-hearth steel constituted 1.3 per cent of the total steel production in 1889, as against 56.2 per cent in 1909. Bessemer steel, on the other hand, although the output increased 153.8 per cent during this period, constituted only 39 per cent of the total production in 1909, as compared with 86.6 per cent in 1889.

Table 72

KIND.	STEEL PRODUCTION (TONS).														
	Amount.					Per cent of increase. ¹					Per cent of total.				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1909	1904	1899	1889	1879
Total.....	23,523,199	13,670,592	10,685,000	4,174,652	1,027,331	120.2	72.1	27.9	155.9	306.3	100.0	100.0	100.0	100.0	100.0
Open-hearth.....	14,228,377	5,820,397	3,044,356	480,035	75,269	367.4	144.5	91.2	534.2	537.8	60.5	42.6	28.5	11.5	7.3
Basic.....	13,221,093	5,064,592	2,153,835	55,511	(²)	513.8	161.0	135.1	3,780.0	.....	56.2	37.0	20.2	1.3	.....
Acid.....	1,007,284	755,805	890,521	424,524	(²)	13.1	33.3	-15.1	109.8	.....	4.3	5.5	8.3	10.2	.....
Bessemer.....	9,180,133	7,768,915	7,532,028	3,617,198	879,650	21.9	18.2	3.1	108.2	311.2	39.0	56.8	70.5	86.6	85.6
Crucible.....	100,263	80,059	104,393	73,882	68,037	-4.0	25.2	-23.3	41.3	8.6	0.4	0.6	1.0	1.8	6.6
Miscellaneous.....	14,426	1,221	4,223	3,537	4,425	241.6	1,081.5	-71.1	19.4	-20.1	0.1	(³)	(³)	0.1	0.4

¹ A minus sign (-) denotes decrease.
² Includes steel produced by establishments not classified as "steel works and rolling mills," as follows: 1909—Total, 49,481 tons; open-hearth, 36,099; (basic, 10,674; acid, 25,425); Bessemer, 6,066; crucible and miscellaneous, 7,316. 1904—Total, 4,184 tons; open-hearth, 2,440; Bessemer, 774; crucible and miscellaneous, 970.
³ Not reported separately. ⁴ Includes electric, 12,577 tons; all other, 1,849 tons. ⁵ Less than one-tenth of 1 per cent.

The tonnage of ingots and of castings is shown, according to process of manufacture, in Table 73.

Table 73

KIND.	STEEL PRODUCTION (TONS).							
	Amount.			Per cent of increase. ¹		Per cent of total.		
	1909	1904	1899	1904-1909	1899-1904	1909	1904	1899
Ingot.....	22,973,964	13,379,083	10,507,844	71.7	27.3	100.0	100.0	100.0
Open-hearth.....	13,725,783	5,548,396	2,878,827	147.4	92.7	59.7	41.5	27.4
Basic.....	12,952,840	4,974,921	2,117,311	160.4	135.0	56.4	37.2	20.1
Acid.....	772,943	573,475	761,516	34.8	-24.7	3.4	4.3	7.2
Bessemer.....	9,145,668	7,754,488	7,528,267	17.9	3.0	39.8	58.0	71.6
Crucible.....	90,242	76,199	100,750	18.4	-24.4	0.4	0.6	1.0
Miscellaneous, including electric.....	12,271							
Castings.....	549,235	231,509	177,156	88.4	64.5	100.0	100.0	100.0
Open-hearth.....	502,594	272,001	165,529	84.8	64.3	91.5	93.3	93.4
Basic.....	268,253	89,671	36,524	199.2	145.5	48.8	30.8	20.6
Acid.....	234,341	182,330	129,005	28.5	41.3	42.7	62.5	72.8
Bessemer.....	34,465	14,427	3,761	138.9	283.6	6.3	4.9	2.1
Crucible.....	10,021	3,860	3,643	159.6	6.0	1.8	1.3	2.1
Miscellaneous, including electric.....	2,155	1,221	4,223	76.5	-71.1	0.4	0.4	2.4

¹ A minus sign (-) denotes decrease.

The tonnage and value of ingots and castings are shown in Table 74.

CLASS.	STEEL PRODUCTION.			Per cent of increase.	
	1909	1904	1899	1904-1909	1899-1904
Total					
Tons.....	23,523,199	13,870,592	10,685,000	72.1	27.9
Value.....	\$482,877,332	\$261,231,978	\$212,638,875	84.8	22.9
Ingots:					
Tons.....	22,973,964	13,379,083	10,507,844	71.7	27.3
Value.....	\$440,340,174	\$240,284,576	\$197,928,982	83.3	21.4
Castings:					
Tons.....	549,235	291,509	177,156	88.4	64.5
Value.....	\$42,537,158	\$20,947,400	\$14,609,893	103.1	43.4
Per cent of total	100.0	100.0	100.0		
Ingots:					
Tons.....	97.7	97.9	98.3		
Value.....	91.2	92.0	93.1		
Castings:					
Tons.....	2.3	2.1	1.7		
Value.....	8.8	8.0	6.9		

¹ Includes steel produced by establishments not classified as "steel works and rolling mills," as follows:

	1909		1904	
	Tons.	Value.	Tons.	Value.
Total	49,481	\$4,140,344	4,184	\$347,264
Ingots.....	5,102	465,634	.....	.....
Castings.....	44,379	3,674,710	4,184	347,264

Production, by states.—The production of steel is shown, by states, for the censuses from 1879 to 1909 in Table 75. States for which the production can not be given without disclosing individual operations are included under "all other states." The most important of these, in 1909, in order of rank, were New York, Colorado, Maryland, Alabama, West Virginia, and Kentucky. The table shows a relative decline since 1899 in the importance of Pennsylvania and Illinois as producers of steel and a relative gain in that of Ohio and Indiana.

STATE.	STEEL PRODUCTION (TONS).				
	1909	1904	1899	1880	1879
Total	23,523,199	13,870,592	10,685,000	4,174,652	1,027,381
Illinois.....	2,671,087	1,555,198	1,460,710	779,956	227,293
Indiana.....	779,772	81,589	51,967	1,116	.....
Michigan.....	10,450	2,500	4,575	4,855	.....
New Jersey.....	95,861	68,288	62,832	21,149	10,663
Ohio.....	4,713,869	2,629,997	1,812,829	395,574	96,324
Pennsylvania.....	12,206,608	7,733,840	6,431,297	2,652,920	586,994
Wisconsin.....	21,888	9,215	2,297	.....	.....
All other states.....	3,023,668	1,690,165	858,493	319,082	106,107
Per cent of total	100.0	100.0	100.0	100.0	100.0
Illinois.....	11.4	11.4	13.7	18.7	22.1
Indiana.....	3.3	0.6	0.5	(¹)	.....
Michigan.....	(¹)	(¹)	(¹)	0.1	.....
New Jersey.....	0.4	0.5	0.6	0.5	1.0
Ohio.....	20.0	18.5	17.0	9.5	9.4
Pennsylvania.....	51.9	66.6	60.2	63.5	57.1
Wisconsin.....	0.1	0.1	(¹)	.....	.....
All other states.....	12.9	12.4	8.0	7.6	10.3

¹ Less than one-tenth of 1 per cent.

Table 76 gives the production, by states, of the different kinds of steel for 1909 and 1904. In Indiana prac-

tically all, and in Pennsylvania much the larger part, of the steel produced in 1909 was made by the open-hearth process, but in Illinois and Ohio the Bessemer process still predominated.

STATE.	STEEL PRODUCTION (TONS).					
	Open-hearth.		Bessemer.		Crucible and miscellaneous.	
	1909	1904	1909	1904	1909	1904
Total	14,228,377	5,820,397	9,180,133	7,768,916	114,889	81,280
Illinois.....	1,020,208	361,650	1,632,758	1,193,548	18,121	.....
Indiana.....	779,598	80,799	.....	.....	180	790
Michigan.....	9,279	.....	.....	2,500	1,171	.....
New Jersey.....	79,742	57,606	6,660	4,177	9,449	6,505
Ohio.....	1,383,725	480,844	3,327,859	2,049,153	2,285	.....
Pennsylvania.....	9,295,459	4,230,657	2,849,112	3,442,312	62,037	60,671
Wisconsin.....	16,280	5,934	2,859	1,648	2,749	1,633
All other states.....	1,644,086	602,907	1,360,885	1,075,577	18,697	11,681
Per cent of total	100.0	100.0	100.0	100.0	100.0	100.0
Illinois.....	7.2	6.2	17.8	15.4	15.8	.....
Indiana.....	5.5	1.4	.....	.....	0.2	1.0
Michigan.....	0.1	.....	(¹)	(¹)	1.0	.....
New Jersey.....	0.6	1.0	0.1	0.1	8.2	8.0
Ohio.....	9.7	8.3	36.3	26.4	2.0	.....
Pennsylvania.....	65.3	72.7	31.0	44.3	54.1	74.6
Wisconsin.....	0.1	0.1	(¹)	(¹)	2.4	2.0
All other states.....	11.6	10.4	14.8	13.8	16.3	14.4

¹ Less than one-tenth of 1 per cent.

Production for consumption and for sale.—In Table 77 is shown the tonnage of steel made for consumption in the works where produced, that transferred to other works of the producing company for consumption, and that produced for sale. The castings were in the main produced for sale.

KIND.	STEEL PRODUCTION (TONS): 1909				
	Total.	For consumption by producing company.			For sale.
		Total.	In works where produced.	For transfer to other works of same company.	
Total	23,523,199	23,033,040	22,920,739	112,301	490,159
Open-hearth	14,228,377	13,781,534	13,709,101	72,433	446,848
Basic.....	13,221,093	12,977,845	12,908,030	69,815	243,248
Acid.....	1,007,284	803,689	801,071	2,618	203,596
Bessemer	9,180,133	9,148,539	9,108,813	39,726	31,594
Crucible.....	100,263	88,890	88,748	142	11,373
Electric and all other.....	14,426	14,077	14,077	.....	349
Ingots	22,973,964	22,942,720	22,830,419	112,301	31,244
Open-hearth	13,728,783	13,698,674	13,626,241	72,433	27,109
Basic.....	12,952,840	12,934,329	12,864,514	69,815	18,511
Acid.....	772,943	764,345	761,727	2,618	8,598
Bessemer	9,145,668	9,143,668	9,103,942	39,726	2,000
Crucible.....	90,242	88,107	87,965	142	2,135
Electric.....	12,271	12,271	12,271	.....	.....
Castings	549,235	90,320	90,320	.....	458,915
Open-hearth	502,594	82,860	82,860	.....	419,734
Basic.....	268,253	43,516	43,516	.....	224,737
Acid.....	234,341	39,344	39,344	.....	194,997
Bessemer	34,465	4,871	4,871	.....	29,594
Crucible.....	10,021	783	783	.....	9,238
Electric and all other.....	2,155	1,806	1,806	.....	349

¹ Includes 49,481 tons produced by establishments not classified as "steel works and rolling mills."

Practically all steel ingots (99.4 per cent in 1909) are at present used by the works producing them in further processes of manufacture. In 1909 only 31,244 tons of ingots were made for sale and only 112,301 for transfer to other works of the same company.

The Bessemer steel produced in 1909 included 23,447 tons (23,321 tons of castings and 126 tons of ingots) made in converters other than standard Bessemer. Of this production, 14,474 tons were made in Tropenas converters and 8,973 tons in those of other or special types. In 1904 the product of the converters other than standard Bessemer was 11,834 tons—all castings.

A production of 522,682 tons of steel, which was partly purified in Bessemer converters and then finished in open-hearth furnaces, was reported by 4 establishments (1 in Alabama, 1 in New York, and 2 in Pennsylvania), the product being classified as open-hearth steel.

Alloy steel.—The census schedule of 1909 for the first time contained an inquiry in regard to alloy steel. It did not indicate any limitation as to the percentage of alloy metal necessary to constitute an alloy steel. This was left for the manufacturer to decide, and the returns do not show the percentages of alloy metal used. The total amount of alloy steels reported was 158,216 tons, this being produced by 36 establishments distributed by states, as follows: Pennsylvania, 21; New Jersey, 3; New York, 3; Ohio, 2; and Connecticut, Delaware, the District of Columbia, Illinois, Massachusetts, Michigan, and Wisconsin, 1 each. Table 78 gives the production of alloy steels, by kind, for 1909.

KIND.	Tons.	KIND.	Tons.
Total alloy steel	158,216	Vanadium	8,039
Aluminum.....	14	Chrome-tungsten.....	600
Chrome.....	11,269	Chrome-vanadium.....	4,406
Manganese.....	5,024	Nickel-chrome.....	26,929
Molybdenum.....	6	Nickel-vanadium.....	620
Nickel.....	37,607	Nickel-chrome-tungsten.....	40
Titanium.....	40,477	Nickel-chrome-vanadium.....	9,280
Tungsten.....	1,697	Not specified.....	12,208

Of the alloy steels, 151,300 tons were ingots and 6,916 tons castings. They were distributed according to process of manufacture as shown in Table 79.

KIND.	ALLOY STEEL PRODUCTION (TONS).	
	Amount.	Per cent of total.
Total	158,216	100.0
Open-hearth.....	100,335	63.4
Basic.....	86,242	54.5
Acid.....	14,093	8.9
Bessemer.....	45,324	28.6
Crucible and miscellaneous.....	12,557	7.9

CAPACITY AND EQUIPMENT.

Capacity of steel works.—Table 80 gives the daily capacity, in tons of steel on double turn, of all active steel plants, for 1909 and 1904, and the steel production for the year. Computed from daily capacity on a basis of 300 working days the total yearly capacity was about 33,000,000 tons in 1909 and 23,500,000 tons in 1904; the actual production was approximately 72 per cent of the computed capacity in 1909, 58 per cent in 1904, and 66 per cent in 1899.

STATE.	DAILY CAPACITY OF ACTIVE STEEL PLANTS (TONS).		STEEL PRODUCTION (TONS).	
	1909	1904	1909	1904
United States	109,570	78,346	23,523,199	13,670,592
Connecticut.....	348	380	54,410	47,307
Delaware.....	117	490	7,827	868
Illinois.....	8,646	9,382	2,671,087	1,555,198
Indiana.....	5,639	498	779,778	81,589
Kentucky.....	933	500	162,835	89,610
Massachusetts.....	835	854	151,791	109,025
Michigan.....	142	18	10,450	2,500
New Jersey.....	1,043	922	95,851	68,288
New York.....	4,942	2,313	1,115,250	474,238
Ohio.....	21,149	13,780	4,713,869	2,529,997
Pennsylvania.....	55,632	40,772	12,206,608	7,733,640
West Virginia.....	1,650	1,260	324,671	214,075
Wisconsin.....	241	81	21,888	9,215
All other states.....	8,253	7,096	1,206,884	755,022

Open-hearth steel furnaces.—The statistics in regard to the number of establishments equipped with open-hearth furnaces and the number and capacity of the furnaces are given, by states, in Table 81. The equipment of the few establishments in industries other than the steel-works and rolling-mill industry is included.

Table 83

STATE AND CENSUS YEAR.	Number of establishments.	BESSEMER CONVERTERS.		TROPENAS CONVERTERS.		OTHER KINDS OF CONVERTERS.	
		Number.	Daily capacity (tons).	Number.	Daily capacity (tons).	Number.	Daily capacity (tons).
United States:							
1899 ¹	54	69	48,377	24	348	2 19	2 280
1904 ²	44	61	42,675	19	95	18	353
Alabama:							
1909.....	1	2	950				
1904.....	1	1	500				
California:							
1909.....	1						
1904.....	1			1	8		
Colorado:							
1909.....	1	2	2,000				
1904.....	1	2	2,000				
Connecticut:							
1909.....	1			1	8		
1904.....	1						
Delaware:							
1909.....	2			2	10	4	32
1904.....	1					3	30
Illinois:							
1909.....	7	8	6,500	3	90	4	77
1904.....	4	8	7,200	3	27		
Kentucky:							
1909.....	1	2	600				
1904.....	1	2	500				
Maryland:							
1909.....	1	3	2,150				
1904.....	1	3	2,200				
Massachusetts:							
1909.....	1					1	200
1904.....	1					2	17
Michigan:							
1909.....	1					2	18
1904.....	1					2	18
Minnesota:							
1909.....	1			1	4		
1904.....	1			1	4		
Missouri:							
1909.....	1					2	48
1904.....	1						
New Jersey:							
1909.....	3	3	180			3	25
1904.....	3					6	45
New York:							
1909.....	2	4	2,780	2	25		
1904.....	2	4	1,290	2	20		
Ohio:							
1909.....	11	16	15,317	2	16	2	25
1904.....	7	12	10,830			1	8
Oregon:							
1909.....	1					1	6
1904.....	1					1	4
Pennsylvania:							
1909.....	15	25	16,515	7	79	1	50
1904.....	12	25	16,895	3	24	1	10
Rhode Island:							
1909.....	1			2	8		
1904.....	1						
Virginia:							
1909.....	1			1	6		
1904.....	1			1	4		
West Virginia:							
1909.....	2	4	1,385				
1904.....	2	4	1,260				
Wisconsin:							
1909.....	2			5	110		
1904.....	2					3	38

¹ Not including 4 Government institutions located in California, the District of Columbia, Massachusetts, and New York, each of which had 1 Tropenas converter.

² Includes the following: Bookwalter, 4 of 32 tons aggregate capacity; Robert-Bessemer, 4 of 41 tons; Schwartz, 2 of 5 tons; Zenges, 2 of 72 tons; side-blown, 3 of 98 tons; and special, 4 of 32 tons.

³ Not including 2 Government institutions located in the District of Columbia and Massachusetts, each of which had 1 Tropenas converter.

Crucible steel furnaces.—The statistics in regard to crucible-furnace equipment are given in Table 84. The statistics for the last two censuses include the equipment of a few establishments not classed as "steel works and rolling mills," comprising eight establishments, with 21 furnaces and 234 pots of 46 tons daily capacity for 1909, and six establishments, with 14 furnaces and 266 pots of 24 tons capacity for 1904.

Table 84

STATE AND CENSUS YEAR.	CRUCIBLE STEEL FURNACES.			
	Number of establishments reporting.	Number of furnaces.	Number of pots that can be used at a heat.	Daily capacity on double turn (tons).
United States:				
1909.....	67	278	4,074	888
1904.....	44	180	2,723	717
1899.....	37	159	2,528	575
Individual states, 1909:				
California.....	2	4	108	8
Connecticut.....	1	2	54	10
Illinois.....	4	19	210	45
Indiana.....	1	4	16	1
Massachusetts.....	3	14	88	10
Michigan.....	3	23	92	10
Minnesota.....	2	11	38	3
New Jersey.....	5	15	310	69
New York.....	6	21	510	99
Ohio.....	5	14	100	15
Pennsylvania.....	24	95	2,314	571
Wisconsin.....	11	58	234	47

Although there was an increase of 74.8 per cent in the number of crucible furnaces, 61.2 per cent in the number of pots available for use at a heat, and 54.1 per cent in daily capacity, between 1899 and 1909, there was a slight decrease during this time in tonnage of crucible steel produced. (See Table 72.)

Electric and miscellaneous steel furnaces.—The manufacture of steel in electric furnaces of the Heroult type was reported by 4 establishments in 1909—1 in Illinois, 1 in New York, and 2 in Pennsylvania. The aggregate daily capacity of the furnaces of this type was 285 tons of steel, the daily capacity per furnace ranging from 5 to 180 tons. No electric steel furnaces were reported at prior censuses.

Eighteen steel-making furnaces of other types aggregating 73 tons in daily capacity were reported by 4 establishments—1 in Connecticut, 1 in Ohio, and 2 in Pennsylvania. These include 12 McHaffie furnaces with a combined daily capacity of 7 tons, 3 cementation furnaces of 60 tons, and 3 special furnaces of 6 tons.

Metal mixers.—Establishments operating blast furnaces and steel plants in conjunction are equipped with metal mixers or reservoirs which receive the molten blast-furnace metal and from which the molten metal is drawn for the converters and the open-hearth furnaces. In 1909, 59 metal mixers, with an aggregate capacity of 14,343 tons, were reported by 30 establishments, of which 14 were in Pennsylvania, 7 in Ohio, 3 in Illinois, 2 in New York, and 1 each in Colorado, Indiana, West Virginia, and Wisconsin. These ranged in capacity from 100 to 500 tons, 24 of them being of 250 tons capacity, 11 of 300 tons, and 2 of 500 tons each.

Hot rolls.—Of the 446 establishments classified as steel works and rolling mills in 1909, 346, or 77.6 per cent, were equipped with hot rolls, these having a daily

capacity on double turn of 150,403 tons of rolled iron and steel. The daily capacity of the hot rolls was

86,964 tons in 1899, the increase for the decade being 72.9 per cent.

Table 85	STATE.	HOT ROLLS.					STATE.	HOT ROLLS.						
		Total.	Having a daily capacity on double turn of—					Total.	Having a daily capacity on double turn of—					
			Less than 100 tons.	100 to 499 tons.	500 to 999 tons.	1,000 to 2,999 tons.			3,000 tons and over.	Less than 100 tons.	100 to 499 tons.	500 to 999 tons.	1,000 to 2,999 tons.	3,000 tons and over.
United States:														
Number of establishments.....						346								
Aggregate daily capacity.....						150,403								
Alabama:														
Number of establishments.....						6								
Daily capacity.....						2,385								
California:														
Number of establishments.....						3								
Daily capacity.....						265								
Connecticut:														
Number of establishments.....						4								
Daily capacity.....						405								
Illinois:														
Number of establishments.....						19								
Daily capacity.....						14,985								
Indiana:														
Number of establishments.....						15								
Daily capacity.....						7,200								
Kentucky:														
Number of establishments.....						7								
Daily capacity.....						1,470								
Maryland:														
Number of establishments.....						5								
Daily capacity.....						2,190								
Massachusetts:														
Number of establishments.....						4								
Daily capacity.....						775								
Michigan:														
Number of establishments.....						3								
Daily capacity.....						170								
Missouri:														
Number of establishments.....						3								
Daily capacity.....						350								
New Jersey:														
Number of establishments.....						11								
Daily capacity.....						1,995								
New York:														
Number of establishments.....						18								
Daily capacity.....						7,365								
Ohio:														
Number of establishments.....						60								
Daily capacity.....						28,000								
Pennsylvania:														
Number of establishments.....						156								
Daily capacity.....						72,895								
Virginia:														
Number of establishments.....						3								
Daily capacity.....						330								
West Virginia:														
Number of establishments.....						16								
Daily capacity.....						3,045								
All other states:¹														
Number of establishments.....						13								
Daily capacity.....						6,578								

¹All other states embrace: Colorado, 1 establishment; Delaware, 2; Georgia, 1; Maine, 1; Oregon, 1; Rhode Island, 2; Tennessee, 1; Texas, 1; Washington, 1; Wisconsin, 1; Wyoming, 1.

The hot-rolling equipment ranges in tonnage capacity per day from a few tons to over 10,000 tons. Table 85 shows statistics for establishments grouped according to daily capacity of hot rolls in 1909. Of the 27 states reporting mills there were only 9 in which any mill was found with a capacity in excess of 1,000 tons; there were, however, 5 mills situated in Illinois, New York, Ohio, and Pennsylvania whose capacity was in excess of 5,000 tons.

In 1909, 63 establishments reported the operation of works, wholly or in part, on triple turn. Of these, 28 were located in Pennsylvania, 21 in Ohio, and 5 in West Virginia. These 63 establishments had an aggregate daily capacity on double turn of 12,115 tons. They constituted 18.2 per cent of the 346 rolling-mill establishments and represented 8.1 per cent of the total capacity.

Natural gas.—Table 86 summarizes the data secured relative to the establishments using natural gas in 1909 and the part of the works in which natural gas was used.

Of the 86 rolling mills using natural gas for heating furnaces, etc., 3 employed it in reverberatory furnaces for puddling pig iron.

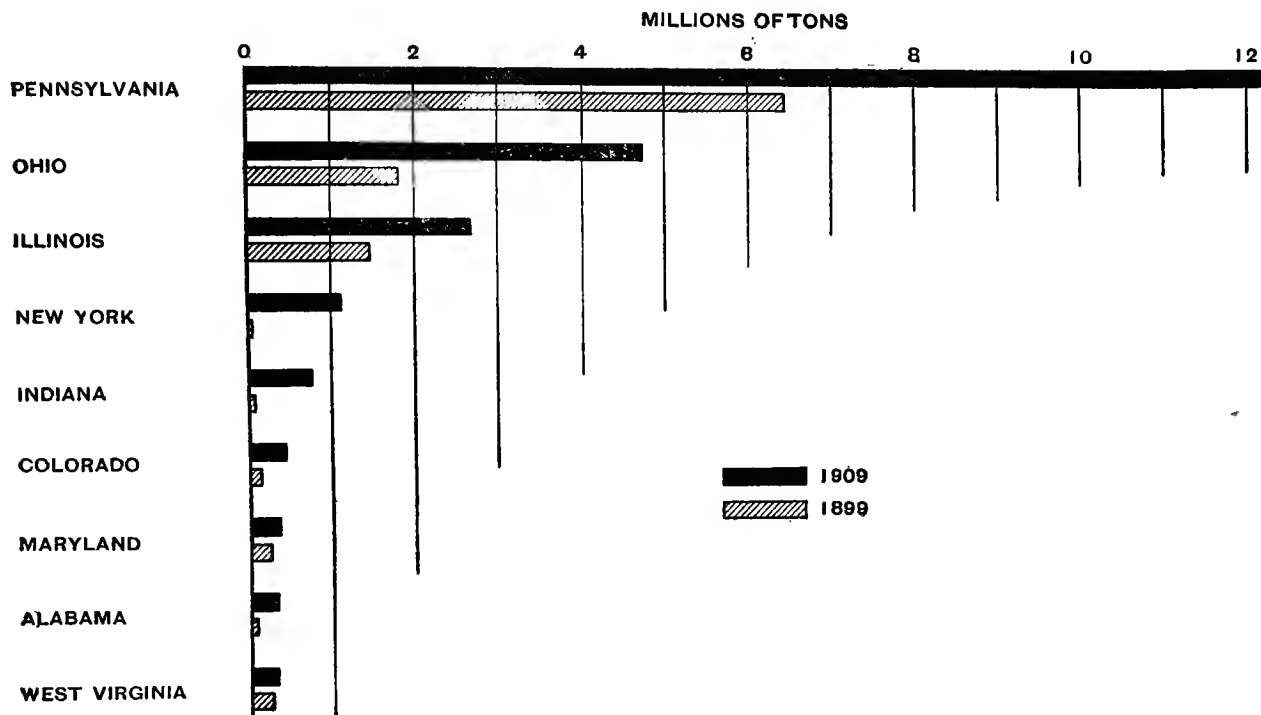
Table 86	STEEL WORKS AND ROLLING MILLS—NUMBER OF ESTABLISHMENTS: 1909						
	United States.	Indiana.	Kentucky.	Maryland.	Ohio.	Pennsylvania.	West Virginia.
Total.....	448	17	7	5	75	188	16
Establishments using natural gas ¹	101	2	2	2	23	63	9
For steel works.....	37	.....	1	1	9	25	1
Open-hearth furnaces.....	23	.....	.....	1	5	16	1
Crucible and miscellaneous furnaces.....	12	.....	.....	.....	.....	12	.....
Bessemer department.....	6	.....	1	.....	4	1	.....
For rolling mills (heating furnaces, including soaking pits, puddling furnaces, annealing furnaces, and forges).....	86	2	2	2	17	54	9
For power department.....	31	.....	1	.....	6	19	5

¹Not including establishments using natural gas in secondary departments only, such as pipe mills, galvanizing and tin-plate dipping departments, foundries, laboratories, etc., or for the heating of ladles.

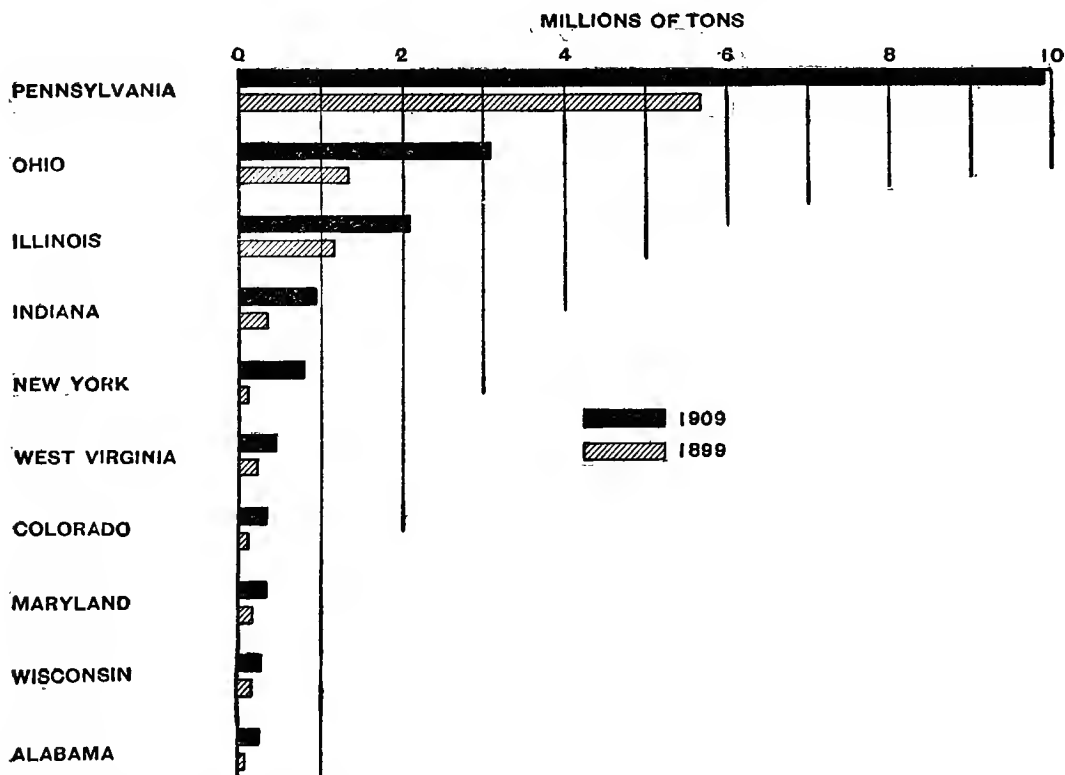
Production of steel and finished rolled products and forgings, by states; 1909 and 1899.—The diagrams on page 51 show the tonnage of steel produced and the tonnage of finished rolled products and forgings for 1909 and 1899, for states having a product in excess of 200,000 tons in 1909. The steel production of all states not shown in the diagrams was 602,670 tons in 1909, and the tonnage of finished rolled products and forgings was 773,511 tons.

STEEL WORKS AND ROLLING MILLS—STEEL PRODUCTION AND FINISHED ROLLED PRODUCTS AND FORGINGS: 1909 AND 1899.

STEEL PRODUCTION.



FINISHED ROLLED PRODUCTS AND FORGINGS.



MATERIALS, PRODUCTS, AND EQUIPMENT IN DETAIL, BY STATES.

The detailed statistics of materials, products, and equipment are given, by states, in Table 87 for 1909, and are presented in six sections. Section I relates to materials; Section II gives the statistics for the direct

or primary products of the establishments; Section III gives the statistics of steel production; Section IV, the statistics of manufactures made in the mills producing from direct or primary products; Section V, the tonnage of products sold for export by the mills; and Section VI, the statistics relating to equipment.

STEEL WORKS AND ROLLING MILLS—DETAILED STATISTICS OF

[Tons of 2,240 pounds.]

Table 87—Continued.		United States.	California.	Connecticut.	Delaware.	Illinois.	Indiana.
II. PRODUCTS—continued.							
Scrap steel and iron:							
1	Tons.....	1,238,554		(1)	1,814	151,296	29,933
2	For sale.....	840,118		(2)	1,814	43,650	29,631
3	For transfer to other works of same company.....	398,436				107,646	302
4	Value.....	\$18,165,624		(2)	\$32,634	\$2,296,298	\$424,899
5	All other steel and iron products not rolled, including value added to steel and iron rolling-mill products by further manufacture.	\$86,534,369	\$786,999	\$519,931	\$271,250	\$4,051,408	\$2,495,447
6	All products, other than steel and iron, not including custom work and repairing.	\$16,356,978	\$579,209	\$94,770	\$7,496	\$1,137,965	\$206,133
7	Custom work and repairing.....	\$1,324,852	(2)	(1)	\$32,408	\$280,746	(2)
III. STEEL PRODUCTION (TONS).							
8	Total.....	23,473,718	(2)	52,827	7,827	2,667,043	777,898
9	Ingots.....	22,968,862	(2)	(2)		2,592,430	764,297
10	For consumption in works where produced.....	22,826,117		(2)		2,564,048	(2)
11	For transfer to other works of same company.....	112,301				28,382	(2)
12	For sale.....	30,444	(2)	(2)			
13	Direct castings.....	504,856	(2)	(2)	7,827	74,613	13,601
<i>Classified according to process:</i>							
14	Open-hearth.....	14,192,278	(2)	52,260	(2)	1,020,208	777,898
15	Basic.....	13,210,419		(2)		(2)	(2)
16	Acid.....	981,859	(2)	(2)	(2)	(2)	(2)
17	Bessemer.....	9,174,067		(2)	(2)	1,631,164	
18	Crucible and miscellaneous, including electric.....	107,373	(2)			15,671	
19	Duplex process—Open-hearth steel partly purified in Bessemer converters before finishing in open-hearth furnaces (included with open-hearth above).	522,682					
20	Alloy steel (included above).....	158,216		(2)	(2)	(2)	
<i>Classified according to process—</i>							
21	Open-hearth.....	100,335					
22	Basic.....	86,242					
23	Acid.....	14,093					
24	Bessemer.....	45,324		(2)	(2)		
25	Crucible and miscellaneous.....	12,557				(2)	
<i>Classified according to form—</i>							
26	Ingots.....	151,300				(2)	
27	Castings.....	6,916		(2)	(2)		
IV. MANUFACTURES FROM IRON AND STEEL ROLLING MILL PRODUCTS.							
(Made in mill producing, value previously included under various items of Group II.)							
Wire and wire products:							
28	Tons (2,000 pounds).....	1,634,855				(2)	(2)
29	Value.....	\$71,624,024				(2)	(2)
Pipe and tubes:							
Wrought-welded—							
30	Tons.....	1,314,771					
31	Value.....	\$68,471,573					
Seamless, hot-rolled or drawn—							
32	Tons.....	54,273					
33	Value.....	\$5,650,739					
All other, including clinched, riveted, etc., but not including cast—							
34	Tons.....	17,561					
35	Value.....	\$986,699					
Bolts, nuts, rivets, forged spikes, washers, etc.:							
36	Kegs (200 pounds).....	4,471,985	55,880	(2)		856,497	
37	Value.....	\$20,538,858	\$268,316	(2)		\$3,165,799	
Cut nails and spikes:							
38	Kegs (100 pounds).....	1,009,319	(2)			(2)	
39	Value.....	\$2,218,207	(2)			(2)	
Horse and mule shoes:							
40	Kegs (200 pounds).....	996,383				(2)	
41	Value.....	\$7,202,897				(2)	
Springs, car, furniture, and all other, not including wire springs:							
42	Tons.....	6,191		(2)			
43	Value.....	\$374,924		(2)			
Cast-iron pipe, car and locomotive wheels, gray-iron, malleable-iron, and semisteel castings, and all castings other than steel:							
44	Tons.....	128,670	16,502	(2)			
45	Value.....	\$5,520,399	\$497,765	(2)			
Galvanized plates or sheets:							
46	Tons.....	431,658			(2)		(2)
47	Value.....	\$25,912,056			(2)		(2)
Stamped ware:							
48	Tons.....	24,612		(2)			(2)
49	Value.....	\$2,296,707		(2)			(2)
50	Steel cars, machinery, switches, frogs, etc.....	\$7,720,178	(2)				
51	Shovels, spades, scoops, etc.....	\$540,321					(2)
V. PRODUCTS SOLD FOR EXPORT (TONS). ³							
52	Total.....	887,648		2,497		17,128	(2)
53	Rails.....	317,455				(2)	2,650
54	Rail fastenings.....	20,118					
55	Pipe and tubes.....	89,377		(2)			
56	Sheet and tin-plate bars.....	85,123					
57	Plates and sheets.....	80,706				(2)	(2)
58	Galvanized plates or sheets.....	79,246					
59	Structural shapes.....	69,764				(2)	
60	Bars and rods.....	48,938				(2)	
61	Wire rods.....	18,738					
62	Blooms, billets, and slabs.....	18,021					1,536
63	Skelp.....	10,703		(2)			
64	Miscellaneous.....	29,457			2,052		3,599

¹ All other states embrace: Alabama, 6 establishments; Colorado, 1; District of Columbia, 1; Georgia, 1; Maine, 1; Maryland, 5; Minnesota, 1; Oregon, 2; Rhode Island, 2; Tennessee, 1; Texas, 1; Virginia, 3; Washington, 1; Wyoming, 1.

MANUFACTURES.

STEEL WORKS AND ROLLING MILLS—DETAILED STATISTICS OF

[Tons of 2,240 pounds.]

Table 87—Continued.		United States.	California.	Connecticut.	Delaware.	Illinois.	Indiana.
VI. EQUIPMENT.							
Steel plants:							
Steel furnaces and converters—							
1	Number	1,061	5	5	8	77	38
2	Daily capacity, tons of steel, double turn	111,656	14	278	117	10,792	5,608
Open-hearth furnaces—							
3	Number	687	1	4	2	48	38
4	Daily capacity, tons of steel, double turn	61,601	8	270	75	3,994	5,608
Basic—							
5	Number	549		3		47	34
6	Daily capacity, tons of steel, double turn	55,273		250		3,934	5,462
Acid—							
7	Number	138	1	1	2	1	4
8	Daily capacity, tons of steel, double turn	6,328	8	20	75	60	146
Converters, Bessemer, or modified Bessemer—							
9	Number	101		1	6	11	
10	Daily capacity, tons of steel, double turn	48,823		8	42	6,590	
Used for desiliconizing and decarburizing molten metal for open-hearth furnaces—							
11	Number	5					
12	Daily capacity, tons of steel, double turn	1,750					
Crucible furnaces—							
13	Number	257	4			17	
14	Number of pots that can be used at a heat	3,840	108			144	
15	Daily capacity, tons of steel, double turn	840	6			28	
Other steel furnaces, including electric—							
16	Number	16				1	
17	Daily capacity, tons of steel, double turn	292				180	
Metal mixers—							
18	Number	59				9	8
19	Capacity, tons	14,343				2,250	900
20	Rolling mills, daily capacity of rolled steel and iron, double turn, tons....	150,403	265	405	45	14,985	7,200

¹ All other states embrace: Alabama, 6 establishments; Colorado, 1; District of Columbia, 1; Georgia, 1; Maine, 1; Maryland, 5; Minnesota, 1; Oregon, 2; Rhode Island, 2; Tennessee, 1; Texas, 1; Virginia, 3; Washington, 1; Wyoming, 1.

STEEL WORKS AND ROLLING MILLS.

MATERIALS, PRODUCTS, AND EQUIPMENT, BY STATES: 1909—Continued.

[Tons of 2,240 pounds.]

	Kentucky.	Massachusetts.	Michigan.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	Wisconsin.	All other states. ¹
1	6	26	28	8	35	55	97	564	9	59	41
2	933	745	142	378	1,038	4,942	21,684	55,278	1,650	156	7,801
3	4	12	3	8	15	27	66	428	5	.....	26
4	333	735	115	378	769	1,998	6,329	38,030	265	.....	2,694
5	3	6	1	8	9	20	58	332	2	.....	26
6	250	555	45	378	499	1,791	5,945	33,300	170	.....	2,694
7	1	6	2	.....	6	7	8	96	3	.....	.....
8	83	180	70	.....	270	207	384	4,730	95	.....	.....
9	2	.....	2	.....	6	6	19	31	4	5	8
10	600	.....	17	.....	205	2,805	15,340	16,615	1,385	110	5,106
11	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	2
12	.....	.....	.....	.....	.....	.....	.....	800	.....	.....	950
13	.....	14	23	.....	14	21	12	91	.....	54	7
14	.....	83	92	.....	280	510	96	2,268	.....	226	28
15	.....	10	10	.....	64	99	15	561	.....	46	1
16	.....	.....	.....	.....	.....	1	.....	14	.....	.....	.....
17	.....	.....	.....	.....	.....	40	.....	72	.....	.....	.....
18	.....	.....	.....	.....	.....	3	13	26	1	1	3
19	.....	.....	.....	.....	.....	683	3,350	5,660	250	500	750
20	1,470	775	170	350	1,995	7,365	27,922	72,977	3,045	1,150	10,292

PART V.—THE WIRE INDUSTRY.

GENERAL STATISTICS FOR THE INDUSTRY AS A WHOLE.

Description of the industry.—The wire industry in its broad sense consists of the drawing of wire from wire rods, the principal metals used being steel and copper.

The manufacture of wire is carried on by three classes of establishments: (1) Establishments whose principal business is the drawing of wire from rods which are either purchased or transferred from independently operated rolling mills of the company, thus including the detached and independently operated wire mills of companies rolling the wire rods; (2) establishments that roll iron and steel, copper or other metals, and maintain wire-drawing departments supplied with rods from the cooperating rolling mills; and (3) establishments whose principal business is the manufacture of some quite different product, but which incidentally draw some wire, usually as material for their own consumption. These three classes are hereafter, for brevity, referred to as (1) wire mills, (2) wire departments of rolling mills, and (3) wire departments of other concerns, and the term "purchased rods," hereinafter employed to distinguish mills of the first class, comprises wire rods brought into the mills from sources outside the plants, whether acquired from independent plants under the same ownership or in the open market.

The establishments falling into the third class—"wire departments of other concerns"—are comparatively unimportant. They include the wire departments of one concern whose principal business is the manufacture of brass ware, one making bronze castings, one making electrical machinery, one making cut and wrought nails independently of rolling-mill operations, one making sewing machines, and one engaged in smelting and refining dross and scrap (falling under the census classification "smelting and refining, not from the ore"). All six of these concerns buy their wire rods.

Rolling mills which roll steel and maintain wire departments are, for general statistical purposes, classed as an entirety in the industry "iron and steel, steel works and rolling mills." Rolling mills which roll copper and brass, including those with wire-drawing departments, are classified by the Census Bureau under the heading "brass and bronze products." Consequently, in the general statistical tables in which all manufacturing industries are listed, only "wire mills"—namely, those whose principal business is the drawing of wire and which purchase their rods or procure them from independently operated rolling mills—are included under the industry designation "wire." In those tables the data for the wire departments of rolling mills or of other classes of establishments are included with the other business of such concerns. This special report,

however, deals in the first place with the wire industry in its broader sense, presenting statistics of the total wire business by whatever class of establishments conducted. The statistics thus presented relate chiefly to the quantity and value of materials and products, separate reports relating to these subjects being obtained from the wire departments of rolling mills and other concerns. No attempt was made, however, to segregate the statistics of capital, persons engaged in the industry, and expenses of operation for such wire-drawing departments, as such a segregation was deemed impracticable.

In addition to presenting these statistics for the wire industry as a whole the present section gives statistics regarding capital, labor, expenses, and other subjects for the wire mills using purchased rods, or for the wire industry in the narrower sense. It should be constantly borne in mind in considering these latter statistics that they relate to less than half of the total wire production.

There are many establishments which draw no wire, but which manufacture wire goods (fencing, wire cloth, springs, etc.) from purchased wire. Such establishments are not covered by the statistics for the wire industry. The manufacture of such further elaborated products from wire is, however, often conducted in wire-drawing establishments, and to that extent this branch of business is covered by the statistics here presented.

In expressing quantities the ton of 2,000 pounds is used.

In the present report comparisons are made, so far as is possible, between the statistics for 1909 and those of the two preceding censuses of manufactures, covering the years 1904 and 1899, respectively. Prior to the present census, however, detailed reports regarding materials and products were not obtained from establishments drawing wire from purchased rods, or from copper and brass rolling mills with wire departments, but only from wire departments of iron and steel rolling mills.

Summary for the wire industry as a whole.—Table 90 shows the relative importance, from the standpoint of value of wire products, of the three classes of establishments above described.

The total number of establishments in the wire industry as a whole in 1909 was 93, of which 56 were wire-drawing mills proper, which purchased the wire rods used, 31 were wire departments of rolling mills, and 6 were wire departments of other concerns. The total value of the products of these 93 mills or wire departments was \$180,083,522, of which \$173,349,614 consisted of wire and products derived therefrom. Of

this latter amount, 45.7 per cent represented the value of products of the wire mills, 50.8 per cent that of the wire departments of rolling mills, and 3.5 per cent that of the wire departments of other concerns. The total value of products involves very little duplication.

Table 90

PRODUCT.	THE WIRE INDUSTRY: 1909			
	Number of establishments.	Value of products.	Per cent of total.	
			Number of establishments.	Value of products.
Total value of products		\$180,083,522		
Wire and manufactures of wire, total.....	93	173,349,614	100.0	100.0
(1) Wire mills.....	56	79,249,869	60.2	45.7
(2) Wire departments of rolling mills.....	31	83,048,105	33.3	50.8
Iron and steel rolling mills.....	23	77,470,814	24.7	44.7
Brass and copper rolling mills.....	8	10,577,291	8.6	6.1
(3) Wire departments of other concerns.....	6	6,051,640	6.5	3.5
All other products.....		6,733,908		

Size of establishments.—The returns permit of a grouping of the establishments in the industry as a whole according to the value of their products, and Table 91 shows data for plants with products of less than \$1,000,000 in value and for plants with products valued at \$1,000,000 and over in 1909.

This table shows the extent to which the large plants predominate, especially among the wire departments of rolling mills. The 24 wire departments of rolling mills whose product exceeded \$1,000,000 in

value together contributed \$89,407,015, or almost one-half, of the total value of products of the industry.

Table 91

VALUE OF PRODUCTS PER ESTABLISHMENT.	THE WIRE INDUSTRY: 1909					
	Total.		Wire mills using purchased rods.		Wire departments of rolling mills and other concerns.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
Total	93	\$180,083,522	56	\$84,486,516	37	\$95,597,004
Less than \$1,000,000.....	52	21,260,888	39	15,070,899	13	6,189,989
\$1,000,000 and over.....	41	158,822,634	17	69,415,619	24	89,407,015
Par cent of total.	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$1,000,000.....	55.9	11.8	69.6	17.8	35.1	6.5
\$1,000,000 and over.....	44.1	88.2	30.4	82.2	64.9	93.5
Average per establishment.....		\$1,936,382		\$1,508,688		\$2,583,703

Distribution of establishments, by states, according to character of business.—Table 92 shows the total number of establishments in the industry as a whole in each state, and also the number of establishments engaged in the manufacture of each of the principal classes of wire products. Of course, many establishments make more than one kind of product, and are therefore listed more than once in the table. It would be impossible to present statistics regarding the quantity and value of individual kinds of products for any considerable number of states separately without disclosing the operations of individual concerns.

Table 92

CLASS OF ESTABLISHMENTS.	ESTABLISHMENTS IN THE WIRE INDUSTRY: 1909—																	
	United States.			Colorado.	Connecticut.	Georgia.	Illinois.	Indiana.	Kentucky.	Massachusetts.	Michigan.	New Jersey.	New York.	Ohio.	Pennsylvania.	Rhode Island.	Virginia.	Wisconsin.
	Wire industry (total).	Wire mills using purchased rods.	Wire departments of rolling mills and other concerns.															
Total number	93	58	37	1	12	1	10	4	1	11	1	11	8	11	16	3	1	2
Wire mills using purchased rods.....	56	56			3		7	2	1	10	1	7	7	6	8	1	1	2
Wire departments of rolling mills and other concerns.....	37		37	1	9	1	3	2		1		4	1	5	8	2		
Manufacturing:																		
Steel and iron wire.....	74	47	27	1	4	1	10	4	1	11		8	3	11	15	2	1	2
Wire for sale—																		
Plain.....	59	34	25	1	2	1	6	4	1	10		7	2	11	12	2		
Coated.....	37	19	18	1	1		8	3		5		3	1	7	8			
Wire nails and spikes.....	36	19	17	1	1	1	8	4	1	3		1	1	6	7	1		2
Wire brads, tacks, and staples.....	24	9	15	1			7	3		1			1	5	5			1
Barbed wire.....	26	11	15	1		1	7	4	1	1				4	6			1
Woven wire, fencing, and poultry netting.....	23	10	13	1	1	1	8	4		1			1	1	5			
Wire rope and strand.....	12	8	4		1		2	1		2		2	1	1	2			
Other wire products.....	34	19	15	1	1		7	1		7		3	2	6	5		1	
Copper wire.....	27	17	10		6		2			3	1	6	5		2	2		
Wire for sale.....	25	15	10		5		2			3	1	6	5		1	2		
Woven-wire products.....	2	1	1		1		1											
Other wire products.....	3	2	1							2					1			
Wire of other metals or alloys (brass, etc.).....	17	8	9		9					1		2	4		1			
Wire for sale.....	14	6	8		7							2	4		1			
Woven-wire products.....	2	2			1							1						
Other wire products.....	4	1	3		2					1					1			

Of the 93 establishments in the industry in 1909, 59 drew iron and steel wire exclusively, 7 drew copper wire exclusively, 6 drew wire from materials (chiefly brass) other than iron and steel or copper, while 21

drew wire from two or more of the metals. A large proportion of the establishments manufactured wire nails, barbed wire, woven wire, and other products for which plain wire is the principal material.

GENERAL STATISTICS FOR WIRE MILLS (ESTABLISHMENTS ENGAGED PRIMARILY IN DRAWING WIRE FROM PURCHASED RODS).

Importance and growth of the industry.—This section of the report on the wire industry deals exclusively with wire mills as above defined—that is, with concerns whose principal business is the drawing of wire and which acquire their wire rods from other establishments. As already shown, such concerns produced in 1909 less than half of the total wire output, and in 1899 their proportion of the total was about one-fifth. The statistics here presented correspond with those presented under the industry designation "wire" in Volumes VIII and IX of the Thirteenth Census Reports.

Table 93 gives the general statistics for wire-drawing mills at the censuses of 1909, 1904, and 1899.

	WIRE MILLS USING PURCHASED RODS.		
	Number or amount.		
	1909	1904	1899
Number of establishments.....	56	25	29
Persons engaged in the industry.....	19,945	5,325	1,715
Proprietors and firm members.....	15	7	18
Salaried employees.....	1,846	581	94
Wage earners (average number).....	18,084	4,737	1,603
Primary horsepower.....	71,959	25,856	9,979
Capital.....	\$60,157,073	\$14,898,817	\$4,242,173
Expenses.....	77,434,862	35,108,758	8,223,710
Services.....	12,515,070	3,651,993	995,972
Salaries.....	2,199,348	793,250	136,327
Wages.....	10,315,722	2,858,743	859,645
Materials.....	60,542,931	30,082,487	7,014,319
Miscellaneous.....	4,376,861	1,394,278	213,419
Value of products.....	84,486,518	37,914,419	9,421,238
Value added by manufacture (value of products less cost of materials).....	23,943,587	7,851,932	2,406,919

Comparisons between the data for the different years in this table do not give a correct idea of the growth of the wire industry as a whole. The industry has developed rapidly but by no means at such a rate as shown by these figures. The explanation of the extraordinary difference between the figures given for 1899 and those given for 1909 is found in the fact that the great bulk of the wire-drawing business was in the earlier year conducted in the wire departments of rolling mills, while in the later year nearly half of it was conducted in separate plants which bought the wire rods used. Data regarding the wire industry in its broader sense are not available for 1904 and 1899, but an approximate idea of its growth may be gained from the statistics of the production of wire rods of iron and steel already presented in Part IV. The output of such wire rods in 1899 was 916,587 long tons; in 1904, 1,792,704 long tons, and in 1909, 2,295,279 long tons, the increase for the decade being 150.4 per cent.

Of the total expenses reported by wire mills in 1909, salaries represented 2.8 per cent; wages, 13.3 per cent; cost of materials, 78.2 per cent; and miscellaneous expenses, 5.7 per cent.

The cost of materials in 1909 represented 71.7 per cent of the total value of products, and the value added by manufacture 28.3 per cent.

Summary, by states.—Table 94 summarizes the more important statistics for wire mills using purchased rods, by states, for 1909, the states being arranged according to the value of products. Comparisons with previous censuses are not made because, for the reason indicated above, they have no significance as showing the growth of the wire industry. The data reported for 1904 and 1899 are, however, shown in Table 112.

STATE.	Number of establishments.	Wage earners.		Value of products.		Value added by manufacture.	
		Average number.	Per cent of total.	Amount.	Per cent of total.	Amount.	Per cent of total.
		United States.....	56	18,084	100.0	\$84,486,518	100.0	$23,943,587	100.0
New Jersey.....	7	5,646	31.2	28,858,428	34.2	6,560,691	27.4
New York.....	7	1,439	8.0	10,065,431	11.9	2,241,913	9.4
Massachusetts.....	10	3,718	20.6	9,579,815	11.3	4,041,922	16.9
Pennsylvania.....	8	946	5.2	2,882,192	3.4	1,132,927	4.7
All other states ¹	24	6,335	35.1	33,100,652	39.2	9,966,134	41.6

¹All other states embrace: Connecticut, 3 establishments; Illinois, 7; Indiana, 2; Kentucky, 1; Michigan, 1; Ohio, 6; Rhode Island, 1; Virginia, 1; Wisconsin, 2.

The three leading states in the value of products of wire mills (mills using purchased rods) were, in 1909, New Jersey, Illinois, and New York; in 1904, Illinois, New Jersey, and New York; and in 1899, New Jersey, Illinois, and Massachusetts. For the industry as a whole the ranking states in 1909 were Pennsylvania, New Jersey, Illinois, Massachusetts, Ohio, and New York.

Persons engaged in the industry.—Table 95 shows, by classes, for 1909, the number of persons engaged in the wire mills using purchased rods. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction. The total number of persons engaged in such mills in 1909 was 19,945, of whom 18,084, or 90.7 per cent, were wage earners.

CLASS.	PERSONS ENGAGED IN WIRE MILLS USING PURCHASED RODS: 1909		
	Total.	Male.	Female.
All classes.....	19,945	18,904	1,041
Proprietors and officials.....	399	395	4
Proprietors and firm members.....	15	13	2
Salaried officers of corporations.....	78	77	1
Superintendents and managers.....	306	305	1
Clerks ¹	1,462	1,240	222
Wage earners (average number).....	18,084	17,269	815
16 years of age and over.....	17,932	17,190	802
Under 16 years of age.....	92	79	13

¹ Includes other subordinate salaried employees.

Table 96 shows, for 1909 and 1904, the average number of wage earners, distributed according to age periods, and in the case of those 16 years of age and over,

according to sex. Data for 1899 are not given because the mills which purchased rods were at that time only a very small factor in the wire industry.

Table 96

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN WIRE MILLS USING PURCHASED RODS.			
	1909		1904	
	Number.	Per cent of total.	Number.	Per cent of total.
Total	18,084	100.0	4,737	100.0
16 years of age and over.....	17,992	99.5	4,711	99.5
Male.....	17,190	95.1	4,513	95.3
Female.....	802	4.4	198	4.2
Under 16 years of age.....	92	0.5	26	0.5

Female wage earners 16 years of age and over formed 4.4 per cent of all wage earners in 1909, as compared with 4.2 per cent in 1904, and boys and girls under 16, 0.5 per cent in both 1909 and 1904.

Wage earners employed, by months.—Table 97 gives the number of wage earners employed in the wire mills of the country on the 15th (or the nearest representative day) of each month during the year 1909.

Table 97

MONTH.	WAGE EARNERS IN WIRE MILLS USING PURCHASED RODS: 1909	
	Number.	Per cent of maximum.
January.....	17,763	90.4
February.....	18,147	92.4
March.....	17,604	89.6
April.....	17,131	87.2
May.....	17,432	88.8
June.....	17,862	90.9
July.....	17,864	91.0
August.....	17,673	90.0
September.....	18,206	92.7
October.....	18,580	94.6
November.....	19,091	97.2
December.....	19,641	100.0

The fluctuations in number of wage earners were comparatively small. The month of minimum employment was April, when the number reported was 87.2 per cent of the maximum number, which was reported for December. The increase from April to December apparently reflects the general improvement in business conditions which took place during the year.

Prevailing hours of labor.—Wage earners in wire mills using purchased rods have been classified according to the hours prevailing in the establishment in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though a few employees work a greater or less number of hours. There is a marked uniformity in the hours of labor prevailing in this industry. Of the 18,084 wage earners in 1909, 7,626, or 42.2 per cent, were in establishments where the prevailing hours were between 54 and 60 per week; 10,232, or

56.6 per cent, in establishments where they were 60 per week; and only 1.2 per cent in establishments where they were 54 or less or more than 60 per week.

Character of ownership.—Table 98 has for its purpose the presentation of conditions in respect to the character of ownership, or legal organization, of the wire mills using purchased rods.

Table 98

CHARACTER OF OWNERSHIP.	WIRE MILLS USING PURCHASED RODS.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	58	25	\$84,488,518	\$37,814,419
Individual and firm.....	7	3	1,683,946	604,678
Corporation.....	49	22	82,802,572	37,309,741
Per cent of total	100.0	100.0	100.0	100.0
Individual and firm.....	12.5	12.0	2.0	1.6
Corporation.....	87.5	88.0	98.0	98.4
Average per establishment:				
Individual and firm.....			\$240,564	\$201,559
Corporation.....			1,689,848	1,895,897

Establishments operated under corporate ownership dominate the industry. Of the establishments under individual and firm ownership in 1909, three were owned by individuals and four by firms; the three reported for 1904 were operated by firms.

Size of establishments.—Table 99 groups the wire mills using purchased rods according to the value of products and shows, for each group, the number of establishments and value of products, together with the percentage of the respective totals represented by each group, for 1909 and 1904.

Table 99

VALUE OF PRODUCTS PER ESTABLISHMENT.	WIRE MILLS USING PURCHASED RODS.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	56	25	\$84,488,518	\$37,814,419
Less than \$20,000.....	4	1	36,337	(¹)
\$20,000 and less than \$100,000.....	5	2	259,017	(¹)
\$100,000 and less than \$1,000,000.....	30	16	14,775,545	5,738,753
\$1,000,000 and over.....	17	6	69,415,619	32,022,742
Per cent of total	100.0	100.0	100.0	100.0
Less than \$20,000.....	7.1	4.0	(²)	(¹)
\$20,000 and less than \$100,000.....	8.9	8.0	0.3	(¹)
\$100,000 and less than \$1,000,000.....	53.6	64.0	17.5	15.1
\$1,000,000 and over.....	30.4	24.0	82.2	84.5
Average per establishment			\$1,508,688	\$1,516,577

¹ Figures omitted, to avoid disclosure of individual operations.
² Less than one-tenth of 1 per cent.

In 1909 establishments with products valued at \$1,000,000 or more constituted only 30.4 per cent of the total number of establishments, but employed 73.6 per cent of the wage earners and produced 82.2 per cent of the total value of products.

Table 100 shows, for 1909, the number of wire mills grouped according to the average number of wage earners employed for each group for seven of the leading states.

Table 100

STATE.	WIRE MILLS USING PURCHASED RODS: 1909																	
	Total.		Establishments employing—															
			1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
Es-tab-lish-ments.	Wage earners (average number)	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States.....	58	18,084	3	5	6	83	5	181	8	591	14	2,499	13	4,307	4	2,579	3	7,339
Connecticut.....	3	643						1	21				2	622				
Illinois.....	7	2,516							1	62	3	439			3	2,015		
Massachusetts.....	10	3,718	2	4						3	428	4	1,162				1	2,124
New Jersey.....	7	5,646			1	14			2	158			3	1,088			1	4,386
New York.....	7	1,439	1	1	1	18			1	60	2	387	1	409	1	564		
Ohio.....	6	2,096							2	151	3	616					1	1,329
Pennsylvania.....	8	946			1	18			2	160	1	197	1	458				

The most numerous group of establishments was that comprising establishments employing from 101 to 250 wage earners, but the group employing the greatest number of wage earners was that comprising the three establishments employing over 1,000 wage earners each.

Engines, power, and fuel.—Table 101 shows, for wire mills using purchased rods, the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current) and their total horsepower, as reported at the censuses of 1909 and 1904. It also shows separately the number and horsepower of all electric motors, including those operated by current generated in the establishments. Data for 1899 are not presented because the wire mills using purchased rods at that time represented only a small part of the wire industry.

This table indicates a decided relative increase in the use of gas engines and in the use of rented electric power between 1904 and 1909. Moreover, a much larger proportion of the primary horsepower generated in the establishments themselves was applied by means of electric motors in the later year than in the earlier.

Table 101

POWER.	WIRE MILLS USING PURCHASED RODS.					
	Number of engines or motors.		Horsepower.		Per cent distribution of horsepower.	
	1909	1904	1909	1904	1909	1904
Primary power, total.....	443	114	71,959	25,856	100.0	100.0
Owned.....	315	114	68,923	25,509	95.7	98.7
Steam.....	268	91	63,409	23,696	88.0	91.6
Gas.....	28	9	3,256	759	4.5	2.9
Water wheels.....	19	14	2,151	1,054	3.0	4.1
Other.....			107		0.1	
Rented.....	128	(¹)	3,036	347	4.2	1.3
Electric.....	128	(¹)	3,031	347	4.2	1.3
Other.....			5		(²)	
Electric motors.....	1,019	60	18,824	1,710	100.0	100.0
Run by current generated by establishment.....	891	50	15,793	1,363	83.9	79.7
Run by rented power.....	128	(¹)	3,031	347	16.1	20.3

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 102 shows, by states, for 1909, the amount of each of the several kinds of power, as well as of the different kinds of fuel, used in the wire mills which purchased wire rods, by states.

Table 102

STATE.	WIRE MILLS USING PURCHASED RODS: 1909																
	Number of establishments reporting.	Total horsepower.	Primary horsepower					Electric horsepower.		Fuel used.							
			Owned by establishments reporting.				Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).	
Total.	Steam engines.	Gas engines.	Water wheels.	Other.	Electric.	Other.	Anthracite (long tons).	Bituminous (short tons).									
United States.....	68	71,959	68,923	63,409	3,256	2,151	107	3,031	5	18,824	15,793	84,208	518,121	22,280	818	71,663	217,620
Connecticut.....	3	7,154	7,154	6,585	445	124		1,592	1,592	313	22,821	776			2,104		
Illinois.....	7	12,380	12,380	11,630		750		2,103	2,103	180,052	1,432		1,432			5,414	
Massachusetts.....	10	10,498	10,401	9,610	68	723		4,839	4,747	42,191	52,025	206	697		17,331	2,405	
New Jersey.....	7	17,436	17,428	16,084	1,344			5,591	5,583	13,628	113,117	2,614			42,930		
New York.....	7	5,455	4,466	4,195	50	114	107	1,719	730	18,356	23,880	7,059	60		4,891		
Ohio.....	6	10,086	8,669	7,645	1,124		1,417	1,607	190	73,347	8,375				1,990	131,010	
Pennsylvania.....	8	2,980	2,930	2,355	225	350		890	840	9,720	15,499	773	54		104	33,266	
All other states.....	8	5,970	5,495	5,405		90		483	8		37,380	1,045	17		2,313	45,625	

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT, FOR THE INDUSTRY AS A WHOLE.

The statistics regarding materials, products, and equipment presented in this section cover not only the wire mills using purchased rods, but also the wire departments of rolling mills and of other concerns producing wire. In general, the tables show the totals for the wire industry as a whole and then show separately the data for wire mills primarily engaged in drawing wire from purchased (or transferred) rods and for all other wire-drawing establishments.

Materials.—Table 103 gives, in detail, the statistics for wire rods consumed in 1909, and for wire purchased as such and used by establishments in the industry either for redrawing or in the manufacture of wire goods of various sorts. The cost of fuel and rent of power, as well as of "all other materials," can be given only for the wire mills using purchased rods, but the quantity and cost of the principal materials can be shown for the entire industry. The materials included under the heading "all other materials" consist of zinc, tin, lead, sulphuric and muriatic acids, oil, lime, containers, mill supplies, and the like. Quantities are given in short tons.

For the wire mills using purchased rods the expense for fuel and rent of power and for "all other materials" (that is, materials other than wire rods and wire) was equal to 18.2 per cent of the cost of wire rods and wire. If a like ratio is assumed for the wire departments of rolling mills and other concerns, the total cost of materials for all wire-drawing establishments and departments can be estimated at about \$137,000,000.

Of the total quantity of steel rods used in 1909, 54.1 per cent were of open-hearth steel and 45.7 per cent of Bessemer steel, only three-tenths of 1 per cent being of crucible and other steel. In wire mills using purchased rods the consumption of Bessemer steel rods largely exceeded that of open-hearth steel rods, while in wire departments of rolling mills and other concerns the consumption of open-hearth steel rods, chiefly basic, was nearly twice that of Bessemer steel rods. The purchased wire reported as material by some of the establishments includes both plain and coated wire.

Approximately two-thirds of the steel wire rods are used by the wire departments of steel rolling mills. The use of iron wire rods is not large, most of them being used in the wire departments of concerns other than steel works and rolling mills. The greater part of the rods of "other metals or alloys," most of which are of brass, are used in the wire-drawing departments of brass rolling mills, but more than two-thirds of the copper rods are used in wire mills using purchased rods.

The per cent distribution of the total cost of the wire rods used in 1909 according to kind of metal is given in Table 104.

Table 103

THE WIRE INDUSTRY—MATERIALS USED: 1909

MATERIAL.	Number or amount.			Per cent of total.	
	Total.	Wire mills using purchased rods.	Wire departments of rolling mills and other concerns.	Wire mills.	Wire departments.
Total cost		\$60,542,931	(1)		
Wire rods.....	\$112,799,516	\$50,810,983	\$61,988,533	45.0	55.0
Steel—					
Tons.....	2,514,504	850,729	1,663,775	33.8	66.2
Cost.....	\$67,439,887	\$23,021,867	\$44,418,020	34.1	65.9
Open-hearth—					
Tons.....	1,359,256	285,961	1,073,295	21.0	79.0
Cost.....	\$38,532,177	\$8,536,361	\$29,995,816	22.2	77.8
Basic—					
Tons.....	1,255,747	233,105	1,022,642	18.6	81.4
Cost.....	\$35,046,106	\$6,695,310	\$28,350,796	19.1	80.9
Acid—					
Tons.....	103,509	52,856	50,653	51.1	48.9
Cost.....	\$3,486,071	\$1,841,051	\$1,645,020	52.8	47.2
Bessemer—					
Tons.....	1,148,353	558,048	590,305	48.6	51.4
Cost.....	\$28,340,445	\$13,936,178	\$14,404,267	49.2	50.8
Crucible and other—					
Tons.....	6,895	6,720	175	97.5	2.5
Cost.....	\$567,265	\$549,328	\$17,937	96.8	3.2
Iron—					
Tons.....	4,849	1,055	3,794	21.8	78.2
Cost.....	\$207,846	\$62,203	\$145,643	29.9	70.1
Copper—					
Tons.....	151,951	102,394	49,557	67.4	32.6
Cost.....	\$40,916,084	\$27,462,312	\$13,453,772	67.1	32.9
Other metals or alloys ² —					
Tons.....	17,944	935	17,009	5.2	94.8
Cost.....	\$4,235,699	\$264,601	\$3,971,098	6.2	93.8
Purchased wire—					
Tons.....	57,922	8,943	48,979	15.4	84.6
Cost.....	\$2,855,911	\$429,390	\$2,426,521	15.0	85.0
Cost of fuel and rent of power.....		\$1,640,172	(1)		
Cost of all other materials.....		\$7,662,386	(1)		

¹ Figures not available.
² Brass, bronze, German silver, zinc, etc., chiefly brass.

Table 104

PER CENT OF TOTAL COST OF WIRE RODS: 1909

KIND OF METAL.	PER CENT OF TOTAL COST OF WIRE RODS: 1909		
	Wire industry.	Wire mills using purchased rods.	Wire departments of rolling mills and other concerns.
Total	100.0	100.0	100.0
Steel and iron.....	60.0	45.4	71.9
Copper.....	36.3	54.0	21.7
Other metals or alloys.....	3.8	0.5	6.4

Of the total cost of wire rods used by the industry as a whole, 60 per cent represented the cost of iron and steel rods, 36.3 per cent that of copper rods, and 3.8 per cent that of rods of other metals or alloys. The percentages by weight are of course very different, copper being much more valuable than iron and steel.

Products.—Table 105 gives, for 1909, the quantity and value of the products in detail for wire mills

using purchased rods and for the wire departments of rolling mills and other concerns, respectively. Comparative data for earlier years are not available. Quantities are given in short tons.

Table 105

KIND.	THE WIRE INDUSTRY—PRODUCTS: 1909				
	Number or amount.			Per cent of total.	
	Total.	Wire mills using purchased rods.	Wire departments of rolling mills and other concerns.	Wire mills.	Wire departments.
Total value of products.	\$180,083,522	\$84,486,518	\$95,587,004	48.9	53.1
Wire, and manufactures of wire	\$173,349,614	\$79,249,869	\$94,099,745	45.7	54.3
Steel and iron—					
Tons.....	2,471,858	821,929	1,649,929	33.3	66.7
Value.....	\$120,535,637	\$47,934,204	\$72,651,433	39.8	60.2
Wire drawn for sale—					
Tons.....	826,451	343,905	482,546	41.6	58.4
Value.....	\$38,845,081	\$18,823,035	\$20,022,046	48.5	51.5
Plain—					
Tons.....	472,046	188,846	283,200	40.0	60.0
Value.....	\$22,632,230	\$11,349,868	\$11,282,362	50.1	49.9
Coated—					
Tons.....	354,405	155,059	199,346	43.8	56.2
Value.....	\$16,212,851	\$7,473,167	\$8,739,684	46.1	53.9
Wire nails and spikes—					
Kegs (100 lbs).....	13,926,861	3,449,753	10,477,108	24.8	75.2
Value.....	\$27,575,774	\$7,142,047	\$20,433,727	25.9	74.1
Wire brads, tacks, and staples—					
Tons.....	28,125	7,334	20,791	26.1	73.9
Value.....	\$1,324,170	\$320,224	\$1,003,946	24.2	75.8
Barbed wire—					
Tons.....	323,565	76,268	247,297	23.6	76.4
Value.....	\$13,881,517	\$3,343,856	\$10,537,661	24.1	75.9
Woven wire, fencing, and poultry netting—					
Tons.....	422,127	115,889	306,238	27.5	72.5
Value.....	\$21,419,170	\$8,724,077	\$14,695,093	31.4	68.6
Wire rope and strand—					
Tons.....	45,303	34,140	11,163	75.3	24.8
Value.....	\$6,683,771	\$5,450,064	\$1,233,707	81.5	18.5
Other wire products (springs, bale ties, cold-rolled flat wire, etc.)—					
Tons.....	129,945	71,906	58,039	55.3	44.7
Value.....	\$10,856,154	\$8,130,901	\$4,725,253	56.5	43.5
Copper—					
Tons.....	154,231	102,604	51,627	66.5	33.5
Value.....	\$47,184,164	\$30,831,646	\$16,352,518	65.3	34.7
Wire drawn for sale ² —					
Tons.....	139,482	102,418	37,064	73.4	26.6
Value.....	\$42,336,274	\$30,736,728	\$11,599,546	72.6	27.4
Wire products—					
Tons.....	14,749	186	14,563	1.3	98.7
Value.....	\$4,847,890	\$94,918	\$4,752,972	2.0	98.0
Other metals or alloys ³ —					
Tons.....	17,407	1,048	16,359	6.0	94.0
Value.....	\$5,579,813	\$484,019	\$5,095,794	8.7	91.3
Wire drawn for sale—					
Tons.....	15,583	1,008	14,575	6.5	93.5
Value.....	\$4,993,378	\$459,583	\$4,533,793	9.2	90.8
Wire products—					
Tons.....	1,824	40	1,784	2.2	97.8
Value.....	\$586,437	\$24,436	\$562,001	4.2	95.8
All other products.....	\$6,733,908	\$5,236,649	\$1,497,259	77.8	22.2

¹ Distributed as follows: Iron and steel rolling mills, \$78,894,036; brass and copper rolling mills, \$10,580,981; wire departments of other concerns, \$6,121,987.

² Includes copper wire used for making insulated wire by the establishment producing it.

³ Brass, bronze, German silver, zinc, etc., chiefly brass.

The wire departments of rolling mills and other concerns produced 66.7 per cent of the total tonnage of steel and iron wire and wire goods reported in 1909, and 94 per cent of the tonnage of wire and wire products of brass and other metals or alloys, but produced only 33.5 per cent of the product from copper.

The per cent distribution of the value of the wire and wire products, according to the metal from which made, is shown in Table 106.

Table 106

KIND OF METAL.	PER CENT OF TOTAL VALUE OF WIRE AND WIRE PRODUCTS: 1909		
	Wire industry.	Wire mills using purchased rods.	Wire departments of rolling mills and other concerns.
Total	100.0	100.0	100.0
Steel and iron.....	69.7	60.5	77.2
Copper.....	27.2	38.9	17.4
Other metals or alloys.....	3.2	0.6	5.4

It will be perceived that the value of steel and iron wire and wire products represented a considerably higher proportion of the value of all wire and wire products than the cost of steel and iron rods represented of the total cost of rods consumed. This is due largely to the fact that the steel and iron products include a much larger proportion of elaborated wire goods than the copper products. In the case of the steel and iron products, two-thirds of the tonnage is represented by wire goods carrying a considerable enhancement in value over plain wire, while in the case of the copper products such wire goods form less than 10 per cent of the total tonnage. Manufactures from purchased wire necessarily enter into the products as reported, but wire purchased is not distributable as a material according to the kind of metal.

The manufacture of insulated wire and cable to the value of \$9,806,989 was reported by the establishments in the wire industry in 1909. The quantity and value of the bare wire employed in the manufacture of this insulated wire and cable is included under "copper wire" in the table, the increase in value on account of insulation being included under "all other products." Most insulated wire is made by establishments in the industry "electrical machinery, apparatus, and supplies." The total value of the insulated wire and cable manufactured in 1909 was \$51,624,737.

The quantity of wire drawn from the different metals, whether for sale or for use in further manufacture by the producing concern, is shown in Table 107. Steel and iron wire represented 93.6 per cent of the total tonnage in 1909, copper wire 5.8 per cent, and wire of other metals or alloys 0.7 per cent.

Table 107

KIND OF METAL.	WIRE DRAWN FOR SALE OR FOR USE IN SAME WORKS (TONS).		
	Wire industry.	Wire mills using purchased rods.	Wire departments of rolling mills and other concerns.
Total	2,553,703	890,263	1,663,440
Steel and iron.....	2,389,136	787,322	1,601,814
Copper.....	147,156	101,890	45,266
Other metals or alloys.....	17,411	1,051	16,360
Per cent of total	100.0	100.0	100.0
Steel and iron.....	93.6	88.4	96.3
Copper.....	5.8	11.4	2.7
Other metals or alloys.....	0.7	0.1	1.0

Table 108 shows the quantity of wire drawn from the different metals in 1909, whether for sale or further manufacture, in the states leading in wire production.

KIND OF METAL AND STATE.	WIRE DRAWN FOR SALE OR FOR USE AS MATERIAL IN SAME WORKS: 1909	
	Quantity (tons).	Per cent of total.
Steel and iron.....	2,389,136	100.0
Pennsylvania.....	851,448	35.6
Illinois.....	531,235	22.2
Ohio.....	400,744	16.8
Indiana.....	179,979	7.5
Massachusetts.....	133,745	5.6
New Jersey.....	121,813	5.1
All other states.....	170,172	7.1
Copper.....	147,158	100.0
New Jersey.....	63,452	43.1
Connecticut.....	22,958	15.6
New York.....	22,325	15.2
Massachusetts.....	11,808	8.0
All other states.....	26,613	18.1
Other metals or alloys.....	17,411	100.0
Connecticut.....	16,152	92.8
New Jersey.....	702	4.0
New York.....	322	1.8
All other states.....	235	1.3

In the production of steel and iron wire, Pennsylvania led in 1909 with 851,448 tons, or 35.6 per cent of the total amount drawn. In the production of copper wire New Jersey led with 63,452 tons, or 43.1 per cent of the total; and in the manufacture of wire from brass and other metals or alloys Connecticut was far in advance of any other state, producing 16,152 tons, or 92.8 per cent of the total output.

Equipment—Wire-drawing blocks and nail and fence machines.—Table 109 shows the number and capacity of the wire-drawing blocks, wire-nail machines, and woven-wire fence machines installed in all wire-drawing establishments in 1909.

The number of wire-drawing blocks is the total number reported by the establishments, whether rod, redrawing, or fine wire blocks. "Rod" blocks are those used for drawing the heavier gauges of wire from the rolled wire rod in one or more drafts. "Redrawing" blocks are those used for the reduction of wire to finer sizes, the limit being about No. 20 gauge. "Fine wire" blocks are those used for still further reduction in sizes below the gauge just named.

STATE.	Wire-drawing blocks.		Wire-nail machines.		Woven-wire fence machines.	
	Number.	Annual capacity (tons).	Number.	Annual capacity (kegs of 100 pounds).	Number.	Annual capacity (tons).
United States, total.	43,697	3,214,000	4,428	18,757,000	446	481,000
Wire mills using purchased rods.....	28,119	1,065,000	1,207	4,694,000	198	135,000
Wire departments of rolling mills and other concerns.....	15,578	2,149,000	3,221	14,063,000	248	346,000
Individual states, 1909:						
Colorado.....	317	200,000	280	2,500,000	2	1,800
Connecticut.....	2,325	96,400	11	22,000	3	1,100
Georgia.....	48	25,000	47	300,000	1	800
Illinois.....	4,354	621,400	626	3,389,000	128	185,500
Indiana.....	390	199,000	320	1,392,000	46	52,800
Kentucky.....	56	24,000	48	300,000	.....	.....
Massachusetts.....	9,666	185,300	109	258,000	85	10,000
Michigan.....	50	2,250	.....	.....	.....	.....
New Jersey.....	10,897	248,300	39	29,000	.....	.....
New York.....	4,203	69,500	150	200,000	.....	.....
Ohio.....	8,852	554,000	1,400	3,570,000	17	37,000
Pennsylvania.....	2,279	952,400	1,329	6,660,000	164	192,000
Rhode Island.....	185	28,500	31	75,000	.....	.....
Virginia.....	50	150	.....	.....	.....	.....
Wisconsin.....	25	7,800	38	62,000	.....	.....

The inquiry did not ask for specific information as to kinds of blocks, but a number of establishments furnished this and the specific data are summarized in Table 110 for all establishments reporting.

CLASS OF MILL.	NUMBER OF WIRE-DRAWING BLOCKS.				Annual capacity (tons).
	Total.	Rod.	Redrawing.	Fine wire.	
Total.....	43,697	.....	.....	.....	3,214,000
In mills reporting kind of blocks.....	21,454	3,460	3,230	14,764	1,847,000
Using—					
Rod only.....	453	453	.....	.....	247,000
Rod and redrawing.....	2,645	2,024	621	.....	1,123,000
Rod, redrawing, and fine wire.....	18,356	983	2,609	14,764	477,000
In mills not reporting kind of blocks.....	22,243	.....	.....	.....	1,367,000

Materials, products, and equipment, in detail, by states.—Table 111 gives, for the United States as a whole, detailed statistics of materials, products, and equipment of the wire industry as a whole, and of the wire mills and wire departments separately. For the wire mills it also presents figures for leading states.

THE WIRE INDUSTRY—DETAILED STATISTICS OF NUMBER OF ESTABLISHMENTS, MATERIALS, PRODUCTS, AND EQUIPMENT: 1909.

[Tons of 2,000 pounds.]

Table 111	The wire industry as a whole.	WIRE MILLS USING PURCHASED RODS.						Wire departments of rolling mills and other concerns. ¹
		Total.	Massachusetts.	New Jersey.	New York.	Pennsylvania.	All other states. ¹	
Number of establishments.....	93	56	10	7	7	8	24	37
MATERIALS USED.								
Total cost.....		\$60,542,831	\$5,537,893	\$22,297,737	\$7,823,518	\$1,749,265	\$23,134,518	
Wire rods.....	\$112,799,516	\$50,810,983	\$4,004,247	\$20,026,428	\$6,908,977	\$1,304,748	\$18,566,583	\$61,988,533
Steel—								
Tons.....	2,514,504	850,729	106,501	92,026	14,850	22,867	614,485	1,663,775
Cost.....	\$67,439,887	\$23,021,867	\$2,887,743	\$3,318,324	\$561,362	\$902,886	\$15,351,552	\$44,418,020
Open-hearth—								
Tons.....	1,359,256	285,961	63,886	86,880	14,390	13,028	107,777	1,073,295
Cost.....	\$38,532,177	\$8,536,361	\$1,673,885	\$3,116,432	\$523,062	\$402,802	\$2,820,180	\$29,995,816
Basic—								
Tons.....	1,255,747	233,105	44,254	61,102	13,040	12,854	101,755	1,022,642
Cost.....	\$35,046,106	\$6,695,310	\$1,186,088	\$1,894,920	\$448,262	\$399,667	\$2,666,383	\$28,350,796
Acid—								
Tons.....	103,509	52,856	19,632	25,778	1,350	74	6,022	50,653
Cost.....	\$3,486,071	\$1,841,051	\$487,797	\$1,121,512	\$74,800	\$3,145	\$153,797	\$1,645,020
Bessemer—								
Tons.....	1,148,353	558,048	40,049	4,825	345	6,123	506,705	590,305
Cost.....	\$28,340,445	\$13,936,178	\$1,061,074	\$133,635	\$25,700	\$185,185	\$12,530,584	\$14,404,267
Crucible and other—								
Tons.....	6,895	6,720	2,566	320	115	3,716	3	175
Cost.....	\$567,265	\$549,328	\$152,784	\$68,257	\$12,600	\$314,899	\$788	\$17,937
Iron—								
Tons.....	4,849	1,055	355	(³)	(³)	(³)	44	3,794
Cost.....	\$207,846	\$62,203	\$20,107	(³)	(³)	(³)	\$2,188	\$145,643
Copper—								
Tons.....	151,951	102,394	(³)	62,915	22,195	(³)	11,850	49,557
Cost.....	\$40,916,084	\$27,462,312	(³)	\$16,502,669	\$6,285,465	(³)	\$3,209,806	\$13,453,772
Other metals or alloys ⁴ —								
Tons.....	17,944	935	(³)	(³)	(³)		10	17,009
Cost.....	\$4,235,699	\$264,601	(³)	(³)	(³)		\$3,037	\$3,971,098
Purchased wire:								
Tons.....	57,922	8,943	7,769	112	249		813	48,979
Cost.....	\$2,855,911	\$429,390	\$303,985	\$8,291	\$77,875		\$39,239	\$2,426,521
Fuel and rent of power.....		\$1,640,172	\$323,955	\$424,705	\$185,851	\$46,242	\$659,419	
All other materials.....		\$7,662,386	\$905,706	\$1,838,313	\$650,815	\$398,275	\$3,869,277	
PRODUCTS.								
Total value.....	\$180,083,522	\$84,486,518	\$8,579,815	\$28,858,428	\$10,085,431	\$2,882,192	\$33,100,652	\$95,597,004
Wire, and manufactures of wire.....	\$173,349,614	\$79,249,869	\$9,517,514	\$26,085,989	\$9,722,787	\$2,611,421	\$31,312,148	\$94,099,745
Steel and iron—								
Tons.....	2,471,858	821,929	101,077	83,636	14,632	23,205	599,379	1,649,929
Value.....	\$120,585,637	\$47,934,204	\$8,400,173	\$8,017,520	\$1,893,995	\$1,963,116	\$27,659,400	\$72,551,433
Wire drawn for sale—								
Tons.....	826,451	343,905	69,081	39,058	12,151	9,078	214,537	482,546
Value.....	\$38,845,081	\$18,823,035	\$4,967,941	\$2,550,661	\$1,338,220	\$710,909	\$9,255,304	\$20,022,046
Plain—								
Tons.....	472,046	188,846	56,995	19,204	12,150	8,753	91,744	283,200
Value.....	\$22,632,230	\$11,349,868	\$4,006,981	\$1,341,601	\$1,336,413	\$694,334	\$3,970,539	\$11,282,362
Coated—								
Tons.....	354,405	155,059	12,086	19,854	1	325	122,793	199,346
Value.....	\$16,212,851	\$7,473,167	\$960,960	\$1,209,060	\$1,807	\$16,575	\$5,284,765	\$8,739,684
Wire nails and spikes—								
Kege (100 pounds).....	13,926,861	3,449,753	(³)	(³)		131,826	3,154,795	10,477,108
Value.....	\$27,575,774	\$7,142,047	(³)	(³)		\$384,599	\$6,413,196	\$20,433,727
Wire brads, tacks, and staples—								
Tons.....	28,125	7,334	(³)	(³)			6,426	20,791
Value.....	\$1,324,170	\$320,224	(³)	(³)			\$253,717	\$1,008,946
Barbed wire—								
Tons.....	323,565	76,268					76,268	247,297
Value.....	\$13,881,517	\$3,343,856					\$3,343,856	\$10,537,661
Woven wire, fencing, and poultry netting—								
Tons.....	422,127	115,889	(³)	(³)			110,360	306,288
Value.....	\$21,419,170	\$6,724,077	(³)	(³)			\$6,002,809	\$14,695,093
Wire rope and strand—								
Tons.....	45,303	34,140	(³)	25,311	(³)	(³)	1,624	11,163
Value.....	\$6,683,771	\$5,450,064	(³)	\$3,893,419	(³)	(³)	\$246,823	\$1,233,707
Other wire products (springs, bale ties, cold-rolled flat wire, etc.)—								
Tons.....	129,945	71,906	17,587	17,832	(³)	(³)	32,424	58,039
Value.....	\$10,856,154	\$6,130,901	\$2,102,001	\$1,512,865	(³)	(³)	\$2,143,695	\$4,725,253
Copper—								
Tons.....	154,231	102,604	(³)	62,686	22,375	(³)	11,707	51,627
Value.....	\$47,184,164	\$30,831,646	(³)	\$17,777,115	\$7,653,209	(³)	\$3,646,576	\$16,352,518
Wire drawn for sale—								
Tons.....	139,482	102,418	(³)	62,686	22,375	(³)	11,613	37,064
Value.....	\$42,336,274	\$30,736,728	(³)	\$17,777,115	\$7,653,209	(³)	\$3,581,494	\$11,599,546
Wire products—								
Tons.....	14,749	186	(³)			(³)	94	14,563
Value.....	\$4,847,890	\$94,918	(³)			(³)	\$65,082	\$4,752,972
Other metals or alloys ⁴ —								
Tons.....	17,407	1,048	(³)	702	319		(³)	16,359
Value.....	\$5,679,813	\$484,019	(³)	\$291,354	\$175,593		(³)	\$5,095,794
Wire drawn for sale—								
Tons.....	15,583	1,008		702	(³)		(³)	14,575
Value.....	\$4,993,376	\$469,583		\$291,354	(³)		(³)	\$4,533,793
Wire products—								
Tons.....	1,824	40	(³)		(³)		(³)	1,784
Value.....	\$586,437	\$24,436	(³)		(³)		(³)	\$562,001

¹ All other states embrace: Connecticut, 3 establishments; Illinois, 7; Indiana, 2; Kentucky, 1; Michigan, 1; Ohio, 6; Rhode Island, 1; Virginia, 1; Wisconsin, 2.² Distributed by states as follows: Colorado, 1 establishment; Connecticut, 9; Georgia, 1; Illinois, 3; Indiana, 2; Massachusetts, 1; New Jersey, 4; New York, 1; Ohio, 5; Pennsylvania, 8; Rhode Island, 2.³ Included in total, but amount not shown, in order to avoid disclosure of individual operations.⁴ Brass, bronze, German silver, zinc, etc., chiefly brass.

THE WIRE INDUSTRY—DETAILED STATISTICS OF NUMBER OF ESTABLISHMENTS, MATERIALS, PRODUCTS, AND EQUIPMENT, 1909—Continued.

[Tons of 2,000 pounds.]

	The wire industry as a whole.	WIRE MILLS USING PURCHASED RODS.						Wire departments of rolling mills and other concerns.
		Total.	Massachusetts.	New Jersey.	New York.	Pennsylvania.	All other states. ¹	
PRODUCTS—continued.								
All other products, including scrap, dross, etc...	\$6,501,069	\$5,083,899	\$54,303	\$2,650,348	\$339,897	\$270,771	\$1,768,580	\$1,417,170
Amount received for custom work and repairing.	\$232,839	\$152,750	\$7,998	\$122,091	\$2,737	.....	\$19,924	\$80,089
<i>Wire drawn, whether for consumption or for sale (tons):</i>								
Steel and iron	2,389,138	787,322	88,755	83,647	14,631	22,948	577,341	1,601,814
Copper	147,156	101,890	(²)	62,686	22,325	(²)	(²)	45,266
Other metals or alloys.....	17,411	1,051	(²)	702	322	.....	(²)	16,360
EQUIPMENT.								
Wire-drawing blocks: ³								
Number.....	43,697	28,119	9,460	10,286	703	387	7,293	15,578
Annual capacity, tons.....	3,214,000	1,065,000	124,000	168,000	39,000	31,000	703,000	2,149,000
Wire-nail machines:								
Number.....	4,428	1,207	109	39	.....	120	939	3,221
Annual capacity, kegs of 100 pounds.....	18,757,000	4,694,000	258,000	29,000	.....	132,000	4,275,000	14,063,000
Woven-wire fence machines:								
Number.....	446	198	85	.....	.....	.....	113	248
Annual capacity, tons.....	481,000	135,000	10,000	.....	.....	.....	125,000	348,000

¹ All other states embrace: Connecticut, 3 establishments; Illinois, 7; Indiana, 2; Kentucky, 2; Michigan, 1; Ohio, 6; Rhode Island, 1; Virginia, 1; Wisconsin, 2.
² Included in total, but amount not shown, in order to avoid disclosure of individual operations.
³ Includes rod, redrawing, and fine-wire blocks.

DETAILED STATE TABLES FOR WIRE MILLS USING PURCHASED RODS.

Tables 112 and 113, which follow, relate exclusively to mills drawing wire from purchased rods, and it should be constantly borne in mind that such mills in 1909 represented less than half of the wire industry and in 1904 and 1899 a very much smaller proportion (about one-fifth in 1899).

Table 112 gives comparative statistics for 1909, 1904, and 1899 as to the number of establishments, persons engaged in the industry, primary horsepower, capital,

salaries, wages, cost of materials, value of products, and value added to materials by manufacture. For the reason stated above, the progress of the wire industry in general can not be judged at all by the changes which took place between 1899 and 1909, as shown in this table.

Table 113 shows, for 1909, more detailed statistics, by states, with reference to the same subjects that are covered by Table 112.

WIRE MILLS USING PURCHASED RODS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States	1909	58	19,945	15	1,848	18,084	71,959	\$60,157	\$2,199	\$10,316	\$60,543	\$34,487	\$23,844
	1904	25	5,325	7	681	4,737	25,858	14,398	793	2,859	30,062	37,914	7,852
	1899	29	1,715	18	94	1,603	8,979	4,242	136	860	7,014	9,421	2,407
Massachusetts.....	1909	10	4,092	6	368	3,718	10,498	8,011	404	2,218	5,538	9,580	4,042
	1904	5	645	3	37	605	2,985	1,215	54	329	1,039	1,617	578
	1899	6	302	4	19	279	.....	669	33	161	776	1,122	346
New Jersey.....	1909	7	6,255	.....	609	5,646	17,436	21,829	624	2,767	22,298	28,858	6,560
	1904	4	678	.....	59	619	4,150	2,047	86	316	9,889	11,104	1,215
	1899	3	192	.....	1	176	.....	1,105	29	122	2,899	3,375	476
New York.....	1909	7	1,521	.....	81	1,439	5,455	5,477	218	758	7,824	10,065	2,241
	1904	6	1,249	.....	68	1,179	4,576	4,788	176	637	8,005	9,431	1,396
	1899	3	55	.....	3	7	.....	96	5	19	149	194	45
Pennsylvania.....	1909	8	1,056	.....	7	103	946	3,935	141	493	1,749	2,882	1,133
	1904	3	118	.....	2	13	103	273	19	56	115	246	131
	1899	9	303	.....	6	23	274	762	27	122	378	607	229
All other states.....	1909	24	7,021	.....	1	685	6,335	20,905	812	4,080	23,134	33,102	9,968
	1904	7	2,635	.....	4	404	2,231	6,576	458	1,521	11,014	15,546	4,532
	1899	8	863	.....	4	30	829	1,610	42	436	2,812	4,123	1,311

WIRE MILLS USING PURCHASED RODS—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15 OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.
								Maximum month.	Minimum month.						
United States.....	56	19,945	15	384	1,240	222	18,084	De 19,641	Ap 17,131	19,929	18,944	884	87	14	71,959
Massachusetts.....	10	4,092	6	111	207	50	3,718	De 4,232	Ap 3,400	4,132	3,973	99	48	12	10,498
New Jersey.....	7	6,255	.....	49	462	98	5,646	De 6,077	Mh 5,392	6,077	5,581	467	29	.....	17,436
New York.....	7	1,521	1	21	53	7	1,439	De 1,593	Ja 1,320	1,594	1,447	140	5	2	5,455
Pennsylvania.....	8	1,056	7	31	59	13	946	Ja 1,032	No 844	1,001	940	56	5	.....	2,980
All other states ¹	24	7,021	1	172	459	54	6,335	.....	.....	7,125	7,008	122	.....	.....	35,590

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States.....	\$60,157,073	\$77,434,862	\$916,497	\$1,282,851	\$10,315,722	\$1,640,172	\$58,902,759	\$37,120	\$204,538	\$6,510	\$4,128,693	\$34,486,518	\$23,943,587
Massachusetts.....	8,011,366	8,724,594	184,246	220,174	2,218,267	323,955	5,213,938	16,642	41,230	444	505,698	9,579,815	4,041,922
New Jersey.....	21,828,514	27,352,436	148,741	474,838	2,766,951	424,705	21,873,032	.....	36,669	.....	1,627,500	28,858,428	6,560,691
New York.....	5,477,199	9,321,121	155,552	62,469	758,079	185,851	7,637,667	14,818	18,028	.....	488,657	10,065,431	2,241,913
Pennsylvania.....	3,934,527	2,662,450	70,950	70,240	493,241	46,242	1,703,023	.....	11,507	.....	267,247	2,882,192	1,132,927
All other states ¹	20,905,467	29,374,261	357,008	455,130	4,079,184	659,419	22,475,099	5,660	97,104	6,066	1,239,591	33,100,652	9,966,134

¹ All other states embrace: Connecticut, 3 establishments; Illinois, 7; Indiana, 2; Kentucky, 1; Michigan, 1; Ohio, 6; Rhode Island, 1; Virginia, 1; Wisconsin, 2.

PART VI.—THE TIN-PLATE AND TERNEPLATE INDUSTRY.

GENERAL STATISTICS FOR THE INDUSTRY.

Description of the industry.—Tin plates are thin plates or sheets of steel or iron, known as black plates, coated by dipping in a bath of molten tin. Terneplates are black plates coated, in like manner, with an alloy of tin and lead known as terne mixture, the proportion of tin varying from 10 to 35 per cent. The term "terne" is taken from the French, and means dull or tarnished. On account of the lead in the mixture terneplates are much duller in appearance than tin plates, which latter are sometimes known as bright plates. There will be found in the Census Reports for the Twelfth Census, Manufactures, Part IV, page 109, a history of the tin and terne plate industry in foreign countries and in the United States, and a description of the processes of manufacture.

Tin-plate manufacture involves two radically different processes—the rolling of the black plates and the dipping of them in tin or terne mixture. The manufacture of black plate is a rolling-mill operation and the bulk of the dipping is performed by dipping departments of such rolling mills. Separate reports were, however, obtained for these dipping departments, as well as for the establishments which were engaged exclusively in the dipping branch of the industry and which bought their black plates.

In the general statistical tables in Volumes VIII and IX of the reports of the Thirteenth Census the dipping

of tin plate (including the dipping departments of rolling mills) is shown as a separate industry, the manufacture of the black plates being covered by the statistics for steel works and rolling mills. The statistics of mills rolling black plates are also included with those for other rolling mills in Part IV of this report. In the present report on tin and terne plate manufacture, however, statistics for the black-plate mills are also shown. The first section of this report presents the combined statistics for the black-plate mills and for the tin and terne dipping departments or establishments, the second section gives statistics for the black-plate branch of the industry separately, and the third gives the statistics for the tin-plate and terneplate dipping business. The last section is more detailed than the others, since it presents an analysis of that branch of the business which is treated by the Census Bureau as constituting in itself a distinctive industry.

BLACK-PLATE AND DIPPING INDUSTRIES COMBINED.

Table 114 gives the most important figures relative to the tin-plate industry as a whole, including black-plate manufacture and tin-plate and terneplate dipping. It may be noted that some rolling mills which roll black plates for tinning also produce other plates

and sheets and still other rolled products, the data for which are included in the statistics in this table.

Table 114 BLACK-PLATE AND DIPPING INDUSTRY AS A WHOLE.

	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
	Number of establishments..	34	44	66	-48.5	-22.7	-33.3
Rolling black plates and dipping.....	27	27	35	.....	.....	.....
Rolling black plates but not dipping.....	3	8	9	.....	.....	.....
Doing tin-plate and terne-plate dipping only.....	4	9	22	.....	.....	.....
Persons engaged in the industry.....	20,397	(?)	(?)	.....	.....	.....
Proprietors and firm members.....	7	(?)	(?)	.....	.....	.....
Salaried employees.....	1,434	861	726	97.6	66.6	18.6
Wage earners (average number).....	18,956	17,164	14,826	27.9	10.4	15.8
Primary horsepower.....	80,764	(?)	(?)	.....	.....	.....
Capital.....	\$42,098,409	\$31,984,487	\$27,323,302	54.1	31.6	17.1
Expenses.....	61,078,213	39,339,943	36,025,354	69.5	55.3	9.2
Services.....	16,352,427	11,496,405	11,106,076	47.2	42.2	3.5
Salaries.....	1,627,814	936,682	818,015	99.0	73.8	14.5
Wages.....	14,724,613	10,559,723	10,288,061	43.1	39.4	2.6
Materials ²	42,430,430	26,028,250	24,414,150	73.8	63.0	6.6
Miscellaneous.....	2,295,356	1,815,288	505,128	312.0	26.4	259.4
Value of products ³	65,378,580	42,690,880	41,322,053	58.2	53.1	3.3
Tin and terne plates.....	45,815,146	34,549,543	31,284,145	46.4	32.6	10.4
All other products.....	19,563,434	8,141,337	10,037,908	94.9	140.3	-18.9
Value added by manufacture (value of products less cost of materials).....	22,948,150	16,662,630	16,907,903	35.7	37.7	-1.5

¹ A minus sign (-) denotes decrease.
² Figures not available.
³ Excluding duplication in the value of black plates reported among the products of the black-plate industry and among the materials of the tin and terne dipping industry. The value of the black plates thus duplicated was in 1909, \$28,981,151; in 1904, \$22,988,237; in 1899, \$20,590,566.

Of the 34 establishments in the combined industry in 1909, 27 both rolled black plates and dipped them, 3 rolled black plates but had no dipping departments, while 4 were engaged in tin and terne dipping only. The number of each of these groups of establishments was smaller in 1909 than in 1899, but the decrease was greatest in the number doing a dipping business only and the number making black plates with no dipping departments. There has been a growing tendency to consolidate the two branches of the business.

The net value of all products in 1909 (excluding duplication on account of the black plates figuring both as products of the black-plate rolling mills and as materials for the dipping establishments) was \$65,378,580, of which amount the value of tin and terne plates represented 70.1 per cent. In 1904 the value of the tin and terne plate product formed 80.9 per cent of the net value of all products of these establishments, and in 1899, 75.7 per cent. The item "all other products" for the respective years comprises chiefly rolling-mill products other than black plates made in the rolling departments of the mills. The value of products of the industry in 1909 was 58.2 per cent greater than in 1899. The value added by manufacture—that is, value of products less cost of materials—was \$22,948,150 in 1909, and the number of wage earners 18,956.

BLACK-PLATE MILLS.

Table 115 shows the general statistics of the black-plate mills, exclusive of the dipping departments, for the years 1909, 1904, and 1899. The 30 establishments rolling black plate include 3 equipped both for the manufacture of steel and for rolling the steel into plates, and 27 equipped for rolling only. The 3 establishments comprising the first group reported products in 1909 valued at \$4,285,683 and the 27 in the second group, products valued at \$42,104,403. The value of the plates turned over to dipping departments is sometimes fixed in a more or less arbitrary manner and may differ from the market value.

Table 115 BLACK-PLATE MILLS, EXCLUDING DIPPING DEPARTMENTS.

	Number or amount.						Per cent of increase. ¹		
	1909			1904			1899		
	1909	1904	1899	1899-1909	1904-1909	1899-1904			
Number of establishments..	30	35	44	-31.8	-14.3	-20.5			
Persons engaged in the industry.....	14,551	(?)	(?)	.....	.....	.....
Proprietors and firm members.....	3	(?)	(?)	.....	.....	.....
Salaried employees.....	944	577	393	140.2	63.6	46.3			
Wage earners (average number).....	13,604	12,317	11,155	22.0	10.4	10.4			
Primary horsepower.....	72,610	(?)	(?)	.....	.....	.....
Capital.....	\$31,103,596	\$21,171,248	\$20,673,255	50.5	46.9	2.4			
Expenses.....	43,264,084	27,869,969	27,470,074	67.5	55.2	1.5			
Services.....	12,417,633	8,803,781	8,924,836	39.1	41.0	-1.4			
Salaries.....	1,007,894	627,128	526,692	91.4	60.7	19.1			
Wages.....	11,409,739	8,176,653	8,398,144	35.9	39.5	-2.6			
Materials.....	29,522,147	17,640,773	18,276,566	61.5	67.4	-3.5			
Miscellaneous.....	1,324,304	1,425,415	268,672	392.9	7.1	430.5			
Value of products.....	46,390,086	30,395,757	30,020,608	54.5	52.6	1.2			
Value added by manufacture (value of products less cost of materials).....	16,867,939	12,754,984	11,744,042	43.6	32.2	8.6			

¹ A minus sign (-) denotes decrease. ² Figures not available.

The equipment of the black-plate departments of tin-plate and terneplate mills is shown in Table 116.

Table 116 BLACK-PLATE DEPARTMENTS OF TIN-PLATE AND TERNEPLATE MILLS.

	Number of establishments reporting.	Hot-rolling mills.		Cold-rolling mills (number).
		Number.	Annual capacity on triple turn (long tons).	
United States:				
1909.....	24	335	1,042,068	268
1904.....	26	315	767,668	272
1899 ¹	(?)	332	641,000	294
Pennsylvania:				
1909.....	14	164	681,000	163
1904.....	15	196	462,000	164
1899 ¹	(?)	160	314,000	157
All other states:				
1909.....	10	171	361,000	105
1904.....	11	119	245,000	108
1899 ¹	(?)	172	327,000	137

¹ Includes idle establishments. ² Figures not available.

TIN-PLATE AND TERNEPLATE DIPPING.

The remainder of this section of the report deals exclusively with the dipping of tin and terne plate. It covers the dipping departments of establishments

which also roll black plates, and the establishments which do dipping only.

Summary and comparison with earlier censuses.—Table 117 summarizes the statistics of the tin and terne dipping industry for 1909, 1904, and 1899.

	TIN-PLATE AND TERNEPLATE DIPPING INDUSTRY.					
	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments..	31	36	57	-45.6	-13.9	-36.8
Persons engaged in the industry.....	5,846	5,132	4,019	45.5	13.9	27.7
Proprietors and firm members.....	4	1	15	-73.3	300.0	-93.3
Salaried employees.....	490	284	333	47.1	72.5	-14.7
Wage earners (average number).....	5,352	4,847	3,671	45.8	10.4	32.0
Primary horsepower.....	8,154	8,990	3,515	132.0	-9.3	155.8
Capital.....	\$10,994,813	\$10,813,239	\$6,650,047	65.3	1.7	62.6
Expenses.....	46,795,280	34,458,211	29,145,846	60.6	35.8	18.2
Services.....	3,934,794	2,692,624	2,181,240	80.4	46.2	23.4
Salaries.....	3,619,920	3,009,554	2,917,323	112.8	100.3	6.3
Wages.....	3,314,874	2,383,070	1,889,917	75.4	39.1	26.1
Materials.....	41,889,434	31,375,714	26,728,150	56.7	53.5	17.4
Miscellaneous.....	971,052	389,873	236,456	310.7	149.1	64.9
Value of products.....	47,969,645	35,283,360	31,892,011	50.4	36.0	10.6
Value added by manufacture (value of products less cost of materials).....	6,080,211	3,907,646	5,163,861	17.7	55.6	-24.3

¹ A minus sign (—) denotes a decrease.

The bulk of the capital reported as invested in the industry represents capital assigned to the dipping departments of rolling mills manufacturing tin-plate and terneplate, and the basis on which this assignment was made may not have been the same for all establishments for all years.

The number of establishments in the industry decreased from 1899 to 1909, while the number of wage earners increased 45.8 per cent and the value of products 50.4 per cent.

The dipping of tin-plate and terneplate is a comparatively simple process and is carried on principally by machinery. As a result, wages formed but 7.1 per cent of the total expenses of the industry in 1909, as compared with 89.5 per cent for materials. The value added by manufacture represented only 12.7 per cent of the value of products in 1909. The number of wage earners in 1909, 5,352, was less than two-fifths as great as the number employed in the black-plate mills.

At the censuses of 1904 and 1899 Pennsylvania was the only state for which statistics for tin-plate and terneplate dipping were given separately. As shown by the figures in Table 132, the average number of wage earners employed in the dipping industry in Pennsylvania increased 843, or 53.4 per cent, during the period 1899-1904, but decreased 75, or 3.1 per cent, during the period 1904-1909. The value of products increased \$6,811,000, or 54.4 per cent, during the earlier period and \$5,892,000, or 30.5 per cent, during the later, while the value added by manufacture decreased \$415,000, or 19.2 per cent, during the earlier period and increased \$584,000, or 33.3 per cent, during the later. In 1909, 52.6 per cent of the total value of products of the industry was reported from Pennsylvania and 19.3 per cent from West Virginia.

Persons engaged in the industry.—Table 118 shows, by classes, for 1909, the number of persons engaged in the industry.

CLASS.	PERSONS ENGAGED IN THE TIN-PLATE AND TERNEPLATE DIPPING INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	5,846	5,275	571
Proprietors and officials.....	98	98	.....
Proprietors and firm members.....	4	4	.....
Salaried officers of corporations.....	20	20	.....
Superintendents and managers.....	74	74	.....
Clerks ¹	396	320	76
Wage earners (average number).....	5,352	4,857	495
16 years of age and over.....	5,322	4,827	495
Under 16 years of age.....	30	30	.....

¹ Includes other subordinate salaried employees.

The average number of persons engaged in the tin-plate and terneplate dipping industry during 1909 was 5,846, of whom 5,352, or 91.5 per cent, were wage earners. A considerable number of women, and a few boys under 16 years of age, were employed.

In order to compare the distribution of persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 119. Comparable figures for 1899 are not available.

CLASS.	PERSONS ENGAGED IN THE TIN-PLATE AND TERNEPLATE DIPPING INDUSTRY.				
	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent of total.	Number.	Per cent of total.	
Total.....	5,846	100.0	5,132	100.0	13.9
Proprietors and firm members.....	4	0.1	1	(1)	300.0
Salaried employees.....	490	8.4	284	5.5	72.5
Wage earners (average number).....	5,352	91.5	4,847	94.4	10.4

¹ Less than one-tenth of 1 per cent.

The table shows a relatively large increase in salaried employees and a small increase in wage earners.

Table 120 shows the average number of wage earners, distributed according to age periods, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899. The table indicates a material decrease in the number of women employed.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE TIN-PLATE AND TERNEPLATE DIPPING INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent of total.	Number.	Per cent of total.	Number.	Per cent of total.
Total.....	5,352	100.0	4,847	100.0	3,671	100.0
16 years of age and over.....	5,322	99.4	4,791	98.8	3,639	99.1
Male.....	4,827	90.2	4,212	86.9	3,014	82.1
Female.....	495	9.2	579	11.9	625	17.0
Under 16 years of age.....	30	0.6	56	1.2	32	0.9

Wage earners employed, by months.—Table 121 gives the number of wage earners employed on the 15th (or the nearest representative day) of each month, during the year 1909, for Ohio, Pennsylvania, and West Virginia.

MONTH.	WAGE EARNERS IN THE TIN-PLATE AND TERNEPLATE DIPPING INDUSTRY: 1909			
	United States.	Ohio.	Pennsylvania.	West Virginia.
January.....	4,924	871	2,021	1,159
February.....	5,187	884	2,010	1,239
March.....	5,215	896	1,963	1,256
April.....	5,868	891	2,273	1,422
May.....	5,621	893	2,290	1,433
June.....	5,775	899	2,366	1,444
July.....	4,771	555	2,261	1,356
August.....	5,079	438	2,308	1,353
September.....	5,215	443	2,406	1,324
October.....	5,494	448	2,688	1,337
November.....	5,692	448	2,795	1,360
December.....	5,686	446	2,751	1,337

Starting with a low number in January the number of wage earners in the industry in the country as a whole increased steadily to the maximum in June, then dropped to the minimum—82.6 per cent of the maximum—in July, and increased again steadily until November. Of the three states reported separately, Ohio shows the greatest fluctuations in number of wage earners and West Virginia the least.

Prevailing hours of labor.—In Table 122 the wage earners in the tin-plate and terneplate dipping industry for the three leading states have been classified according to the hours of labor prevailing in the establishments in which they are employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though some employees work a greater or less number of hours.

STATE.	In establishments with prevailing hours—					
	Total.	48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.
		United States.....	5,352	729	2,841	1,503
Ohio.....	676	461	137	78	
Pennsylvania.....	2,346	206	1,539	400	201	
West Virginia.....	1,335	523	456	356	

More than four-fifths of the wage earners employed in the industry in 1909 were in establishments where the prevailing hours of labor were 54 or from 54 to 60 per week. Only 5.2 per cent of the total were employed in establishments where the prevailing hours were as high as 60 per week.

Character of ownership.—Of the 31 establishments in the industry, 2 were owned by individuals, 1 by a firm, and 28 by corporations.

Size of establishments.—The tendency toward concentration in large establishments, which prevails in the iron and steel industry, is very marked in the tin and terne plate industry. This is plainly shown in Table 123, which groups the establishments according to the value of their products for 1909 and 1904.

VALUE OF PRODUCTS PER ESTABLISHMENT.	TIN-PLATE AND TERNEPLATE DIPPING INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	31	36	\$47,989,645	\$35,283,360
Less than \$100,000.....	3	3	175,689	219,398
\$100,000 and less than \$1,000,000.....	10	21	5,623,373	9,940,551
\$1,000,000 and over.....	18	12	42,170,583	25,123,411
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$100,000.....	9.7	8.3	0.4	0.6
\$100,000 and less than \$1,000,000.....	32.3	58.3	11.7	28.2
\$1,000,000 and over.....	58.1	33.3	87.9	71.2
Average per establishment.....	.....	.....	\$1,547,408	\$980,093

In 1909 there were 18 establishments which reported products valued at \$1,000,000 and over each, as compared with 12 such establishments in 1904. The value of products of this group increased over \$17,000,000, while the value of products for each of the smaller groups decreased. The average value of products per establishment increased from \$980,093 in 1904 to \$1,547,408 in 1909.

A classification of the establishments according to the number of wage earners employed is presented in Table 124.

CLASS.	Number of establishments.	Wage earners.	
		Average number.	Per cent of total.
		Total.....	31	5,352	100.0
Establishments employing—			
6 to 20 wage earners.....	4	47	0.9
21 to 50 wage earners.....	2	88	1.6
51 to 100 wage earners.....	6	469	8.8
101 to 250 wage earners.....	12	2,035	38.0
251 to 500 wage earners.....	5	1,604	30.0
Over 500 wage earners.....	2	1,109	20.7

The largest number of establishments and the largest number of wage earners are found in the group employing from 101 to 250 wage earners each. The average number of wage earners per establishment increased from 135 in 1904 to 173 in 1909.

Expenses.—Table 125 gives, in percentages, the distribution of the total reported expenses of tin-plate and terneplate dipping plants in 1909 among the several classes of expenses.

The cost of materials constitutes a larger proportion of the total expenses in the tin-plate and terneplate dipping industry than in most other manufacturing industries.

Table 129

	TIN PLATE, TERNEPLATE, AND TAGGERS' TIN.							
	Quantity (pounds).				Per cent of increase. ¹			
	1909	1904	1899	1889	1899-1909	1904-1909	1899-1904	1889-1899
Retained for consumption, total.....	1,462,337,579	1,173,329,667	881,297,455	740,155,040	49.0	24.6	19.6	3.4
Domestic production.....	1,343,103,266	1,032,940,706	850,004,495	(?)	58.0	30.0	21.5	.....
Exports of domestic product.....	20,893,368	17,691,351	298,615	.....	6,896.8	18.1	5,824.4	.....
Retained for consumption.....	1,322,209,898	1,015,249,355	849,705,880	.....	55.6	30.2	19.5	.....
Imports.....	140,208,441	158,260,762	131,970,441	742,135,787	6.2	-11.4	19.9	-82.2
Reexports.....	30,760	180,450	378,866	1,979,747	-91.9	-83.0	-52.4	-80.9
Retained for consumption.....	140,177,681	158,080,312	131,591,575	740,155,040	6.5	-11.4	20.1	-82.2
Per cent of total retained for consumption:								
Domestic.....	90.4	86.5	86.6	.....	.....	.....	.....	.....
Foreign.....	9.6	13.5	13.4	.....	.....	.....	.....	.....

¹ A minus sign (-) denotes decrease.² Not reported separately.

Dipping sets.—Table 130 shows the equipment and daily capacity of the tin-plate and terneplate dipping establishments in operation in 1909, 1904, and 1899.

that made tin plate as an intermediate or secondary product.

The tin-plate and terneplate product for 1909 was equal to 77.6 per cent of the full capacity of all active establishments on double turn on the basis of 300 working days for the year; the output of tin plate alone was 90.6 per cent of the annual capacity of tinning sets on double turn, and the terneplate product 42.3 per cent of the capacity of terne dipping sets. In 1904 the tin-plate and terneplate product was 49.5 per cent of the capacity of all active establishments on double turn.

The majority of the establishments operate on double or triple turn. Of the 31 establishments in the tin-plate and terneplate dipping industry proper, 5 operated on single turn in 1909, 10 on double turn, and 16 on triple turn. The aggregate daily capacity of these plants as operated was 7,016,000 pounds, and their actual output in 1909 was 62.5 per cent of their total capacity, on the basis of 300 working days for the year. There were, in 1909, 14 establishments engaged in the manufacture of tin plate exclusively and 4 in the manufacture of terneplate exclusively, while 13 establishments made both tin plate and terneplate. Five establishments reported 49 tin-plate or terneplate sets as being in course of construction.

Materials, products, and equipment, by states.—The detailed statistics of materials, products, and equipment for the tin-plate and terneplate dipping industry in 1909 are given in Table 131.

Table 130

	TIN-PLATE AND TERNEPLATE DIPPING INDUSTRY.						
	Number of establishments.	Number of dipping sets.			Daily capacity of sets, single turn (pounds, expressed in thousands).		
		Total.	Employed on—		Total.	Tin plates.	Terneplates.
		Tin plates.	Terneplates.				
United States:							
1909.....	134	573	455	118	2,840	2,078	764
1904.....	238	618	499	120	3,454	2,887	567
1899.....	57	583	(²)	(²)	2,733	2,004	729
Ohio:							
1909.....	4	74	55	19	487	360	127
1904.....	5	95	60	35	558	447	111
1899.....	13	103	(²)	(²)	495	358	137
Pennsylvania:							
1909.....	18	318	265	53	1,570	1,184	386
1904.....	19	321	266	55	1,889	1,554	335
1899.....	25	285	(²)	(²)	1,198	792	406
West Virginia:							
1909.....	6	99	72	27	472	332	140
1904.....	4	54	40	14	345	273	72
1899.....	2	23	(²)	(²)	154	75	79
All other states:							
1909.....	6	82	63	19	311	200	111
1904.....	10	149	133	16	662	613	49
1899.....	17	172	(²)	(²)	886	779	107

¹ Includes 3 establishments; 1 each in Illinois, Michigan, and Pennsylvania, not classified as engaged in the tin plate and terneplate industry.² Includes 2 establishments in Illinois not classified as engaged in the tin plate and terneplate industry.³ Not reported separately.

The table includes also for 1904 and 1909 the equipment of the few establishments in other industries

TIN PLATE AND TERNEPLATE—DETAILED STATISTICS OF NUMBER OF ESTABLISHMENTS, MATERIALS, PRODUCTS, AND EQUIPMENT, BY STATES: 1909.

Table 131	United States.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Number of establishments.....	31	4	17	6	4
MATERIALS USED.					
Total cost.....	\$41,889,434	\$7,155,144	\$22,898,352	\$7,367,268	\$4,488,672
Black plates or sheets:					
Pounds.....	1,321,071,691	213,764,915	705,748,494	254,685,445	146,872,837
Produced by establishment reporting.....	1,291,048,109	213,764,915	703,854,394	228,857,602	144,571,198
Purchased.....	30,023,582	.....	1,894,100	25,827,843	2,301,639
Cost.....	\$28,981,151	\$5,143,579	\$15,801,297	\$5,039,683	\$2,996,592
Coating metals:					
Pounds.....	40,927,759	8,064,988	20,269,205	7,927,714	4,665,852
Tin, including tin contents of terne mixture purchased.....	31,077,651	4,897,600	17,348,711	5,269,178	3,562,162
Lead, including lead contents of terne mixture purchased.....	9,850,108	3,167,388	2,920,494	2,658,536	1,103,690
Cost.....	\$9,670,037	\$1,587,798	\$5,305,175	\$1,669,975	\$1,107,089
In condition purchased—					
Pig tin—					
Pounds.....	28,586,267	3,872,221	16,858,292	4,663,663	3,192,091
Cost.....	\$8,490,794	\$1,142,704	\$5,032,023	\$1,370,502	\$945,565
Pig lead—					
Pounds.....	2,708,496	249,000	1,421,219	935,158	103,129
Cost.....	\$117,656	\$10,612	\$62,338	\$40,248	\$4,458
Terne mixture—					
Pounds.....	9,632,996	3,943,767	1,989,694	2,328,903	1,370,632
Cost.....	\$1,061,587	\$434,482	\$210,814	\$259,225	\$157,066
All other materials.....	\$3,238,246	\$423,767	\$1,791,880	\$657,608	\$364,991
PRODUCTS.					
Total value.....	\$47,969,645	\$7,889,367	\$25,234,066	\$9,257,524	\$5,588,688
Tin plate and terneplate:					
Pounds.....	1,315,313,132	212,737,039	695,377,287	257,807,156	149,391,650
Value.....	\$45,815,146	\$7,669,423	\$23,750,750	\$8,922,099	\$5,472,874
Tin plate—					
Pounds.....	1,123,968,875	157,584,871	648,502,133	189,239,233	128,642,638
Value.....	\$38,259,885	\$5,500,501	\$21,687,492	\$6,360,880	\$4,711,012
Terneplate—					
Pounds.....	191,344,257	55,152,168	46,875,154	68,567,923	20,749,012
Value.....	\$7,555,261	\$2,168,922	\$2,063,258	\$2,561,219	\$761,862
Other sheet iron or sheet steel tinned or terneplated, taggers' tin, etc.:					
Pounds.....	19,400,934	.....	18,067,567	.....	.....
Value.....	\$520,465	.....	\$484,211	\$335,425	\$115,814
All other products.....	\$1,634,034	\$219,944	\$999,105	.....	.....
EQUIPMENT.					
Tin-plate or terneplate dipping sets at end of year:					
Completed—					
Number.....	563	74	311	99	79
Usually employed on tin plate.....	450	55	263	72	60
Usually employed on terneplate.....	113	19	48	27	19
Daily capacity, single turn, pounds.....	2,795,972	487,164	1,533,872	471,931	303,005
Tin plate.....	2,055,915	359,924	1,172,311	332,019	191,661
Terneplate.....	740,057	127,240	361,561	139,912	111,344
Building, number.....	49	.....	23	15	6
Number of establishments operating on—					
Single turn.....	5	.....	3	.....	2
Double turn.....	10	2	6	2	.....
Triple turn.....	16	2	8	4	2
Daily capacity as operated, whether on single, double, or triple turn, pounds.....	7,016,293	1,301,399	3,618,308	1,293,793	802,793
Hot black-plate mills at end of year:					
Completed—					
Number.....	335	98	164	45	28
Annual capacity on triple turn, long tons.....	1,042,088	143,795	681,398	141,631	75,264
Building—					
Number.....	20	.....	10	10	.....
Annual capacity on triple turn, long tons.....	36,600	.....	3,600	33,000	.....
Cold mills, completed.....	208	37	163	46	22

¹ All other states embrace: Illinois, 1 establishment; Indiana, 1; and New York, 2.

MANUFACTURES.

DETAILED STATE TABLES.

The principal facts derived from the census inquiry concerning tin-plate and terneplate dipping are presented in two general tables.

of the industry in the United States and in the state of Pennsylvania for the years 1909, 1904, and 1899.

Table 133 gives similar statistics in a somewhat more detailed form than Table 132 for 1909 only.

Table 132 gives the more important general statistics

TIN PLATE AND TERNEPLATE—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1809	31	5,846	4	490	5,352	8,164	\$10,395	\$820	\$3,315	\$41,839	\$47,970	\$6,081
	1904	36	5,132	1	284	4,847	8,390	10,813	310	2,383	81,376	35,283	3,807
	1899	67	4,019	16	333	3,671	3,615	6,850	291	1,890	26,728	31,892	6,164
Pennsylvania.....	1909	17	2,548	3	199	2,346	1,565	5,520	275	1,339	22,898	25,234	2,336
	1904	19	2,613	1	191	2,421	5,805	4,692	219	1,207	17,590	19,342	1,752
	1899	25	1,778	11	189	1,578	1,426	3,027	147	814	10,364	12,531	2,167
All other states.....	1909	14	3,298	1	291	3,006	6,589	5,475	345	1,976	18,991	22,736	3,745
	1904	17	2,519	.....	93	2,426	3,185	6,121	91	1,176	13,786	15,941	2,155
	1899	32	2,241	4	144	2,093	2,089	3,623	144	1,076	16,364	19,361	2,997

TIN PLATE AND TERNEPLATE—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horse-power.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.			Under 16.	
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.		Male.	Female.
								Maximum month.	Minimum month.						
United States...	31	5,846	4	94	320	76	5,352	Je 5,775	Jy 4,771	6,307	5,689	583	35	.....	3,154
Ohio.....	4	742	.....	10	48	8	676	Je 899	Au 438	896	767	129	.....	.....	1,849
Pennsylvania.....	17	2,548	3	43	109	47	2,346	No 2,795	Mh 1,963	2,751	2,448	278	25	.....	1,565
West Virginia.....	6	1,465	.....	31	86	13	1,335	Je 1,444	Ja 1,159	1,476	1,341	125	10	.....	890
All other states ¹	4	1,091	1	10	77	8	995	.....	.....	1,184	1,133	51	.....	.....	3,850

STATE.	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States..	\$10,994,813	\$46,785,280	\$225,683	\$394,337	\$3,314,874	\$289,875	\$41,599,758	\$1,900	\$52,720	.....	\$916,432	\$47,969,645	\$6,080,211
Ohio.....	1,063,491	7,733,673	18,473	57,083	449,242	29,835	7,125,309	.....	7,036	.....	46,895	7,889,367	734,223
Pennsylvania.....	5,520,066	24,844,283	110,560	164,838	1,338,637	113,270	22,785,082	1,900	24,366	.....	305,630	25,234,066	2,335,714
West Virginia.....	2,497,863	8,752,686	50,253	87,532	847,192	42,375	7,324,891	.....	10,553	.....	389,890	9,257,524	1,890,258
All other states ¹	1,913,393	5,464,638	48,297	84,884	679,803	104,195	4,364,477	.....	10,765	.....	174,217	5,588,688	1,120,016

¹ All other states embrace: Illinois, 1 establishment; Indiana, 1; New York, 2.

ELECTRICAL MACHINERY, APPA-
RATUS, AND SUPPLIES

ELECTRICAL MACHINERY, APPARATUS, AND SUPPLIES.

GENERAL STATISTICS.

This industry includes the manufacture of the machines and appliances used in the generation, transmission, and utilization of electric energy, together with most of the parts, accessories, and supplies for them. It does not include, however, the production of poles, whether of wood, iron, or steel; nor does it include the manufacture of glass and porcelain ware

made expressly for electrical purposes, that of bare iron and copper wire, or any of the group of electrochemical and electrometallurgical products.

Comparison with earlier censuses.—Table 1 summarizes the statistics of the manufacture of electrical machinery, apparatus, and supplies for each census from 1879 to 1909, inclusive.

Table 1	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	1,009	784	581	189	76	73.7	28.7	34.9	207.4	148.7
Persons engaged in the industry.....	105,600	71,485	(2)	(2)	(2)	47.7	9.8	.....	.....	.....
Proprietors and firm members.....	439	400	(2)	(2)	(2)	253.4	68.6	109.6	.....	.....
Salariat employees.....	17,905	10,619	5,067	(2)	(2)	107.7	44.3	43.9	377.3	.....
Wage earners (average number).....	87,256	60,466	42,013	8,802	1,271	263.5	50.7	141.3	.....	.....
Primary horsepower.....	153,768	105,376	43,674	7,494	(2)	220.2	53.9	108.1	340.4	1,158.3
Capital.....	\$267,844,432	\$174,066,026	\$83,659,924	\$18,997,337	\$1,509,758	147.7	58.0	56.8	431.1	.....
Expenses.....	201,771,157	127,718,040	81,473,822	15,340,148	(2)	176.0	62.1	70.3	369.8	685.5
Services.....	69,574,540	42,932,406	25,210,917	5,366,188	683,164	336.0	82.1	139.5	.....	.....
Salaries.....	20,193,395	11,090,885	4,631,723	(2)	(2)	140.0	55.1	54.7	.....	.....
Wages.....	49,381,145	31,841,521	20,579,194	(2)	(2)	119.5	62.4	35.1	460.8	689.9
Materials.....	108,566,404	66,836,926	49,458,272	8,819,498	1,116,470	247.3	31.7	163.8	489.4	.....
Miscellaneous.....	23,630,213	17,948,708	6,804,633	1,154,462	(2)	139.4	57.2	52.3	383.6	619.9
Value of products.....	221,308,563	140,809,369	92,434,435	19,114,714	2,655,036	162.3	52.4	72.1	317.4	569.1
Value added by manufacture (value of products less cost of materials).....	112,742,159	73,972,443	42,976,163	10,295,216	1,538,566	.....	.....	.....	.....	.....

¹ Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

The manufacture of electrical machinery, apparatus, and supplies is of comparatively recent origin, having been first reported as a separate industry at the census of 1879, and detailed statistics of products for the United States as a whole were not published until the census of 1899. The industry has developed rapidly, the value of the products reported for 1909 being more than eighty-three times as great as the value for 1879. During the last decade the industry increased \$128,874,128, or 139.4 per cent, in value of products; 45,243, or 107.7 per cent, in the average number of wage earners; and \$69,765,996, or 162.3 per cent, in the value added by manufacture. These relative increases, however, are less than those reported for the two decades 1879-1889 and 1889-1899.

Summary, by states.—Table 2 summarizes, by states, the more important statistics of the industry, the states being arranged according to the value of products reported for 1909. The rank of each state as shown in the table is its rank among all states in the industry. The figures for one state are omitted, to avoid disclosing individual operations, although this state ranked higher than several of the others for which figures are given.

The diagram on the next page shows graphically the value of products for the most important states in the industry in 1909 and 1899.

Although establishments engaged in the manufacture of one or more of the various classes of products embraced in this industry were reported from 38 states and the District of Columbia in 1909, the industry was largely centralized in the six states of New York, Pennsylvania, New Jersey, Massachusetts, Illinois, and Ohio. These states, together, reported 84 per cent of the total average number of wage earners, 82.6 per cent of the total value of products, and 83.1 per cent of the total value added by manufacture.

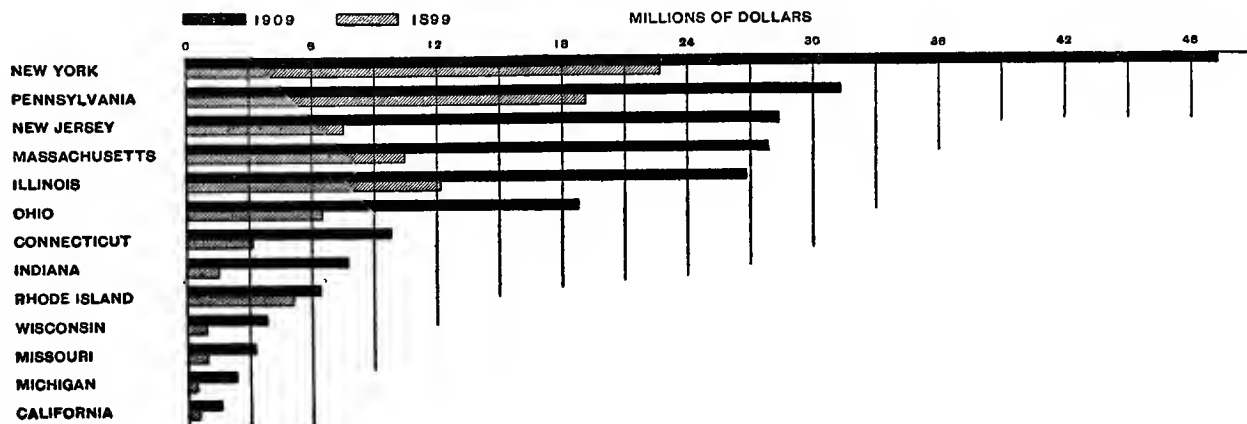
New York was the leading state in the industry, ranking first at the censuses of 1909 and 1904. During 1909 the state produced electrical machinery, apparatus, and supplies to the value of \$49,289,815, or more than one-fifth of the total for the United States. The number of wage earners employed in the state increased 83 per cent during the decade ending with 1909, while the value of products and the value added by manufacture more than doubled. Pennsylvania ranked second among the states in 1909 and 1904 in value of products and in value added by manufacture, though in the average number of wage earners employed it dropped from second place in 1904 to fourth place in 1909. In 1909 New Jersey, which showed the most rapid development of any of the six leading states in the industry, ranked third in

MANUFACTURES.

number of wage earners employed and value of products, advancing from fourth place in number of wage earners and from fifth place in value of products during the preceding five years. Michigan, which

occupies a position of minor importance among the states in the industry, shows the largest percentages of increase in all three items, while Connecticut, Indiana, and Wisconsin also show large relative gains.

ELECTRICAL MACHINERY, APPARATUS, AND SUPPLIES—VALUE OF PRODUCTS, FOR LEADING STATES: 1909 AND 1899.



SUMMARY, BY STATES.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹											
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Wage earners.			Value of products.			Value added by manufacture.				
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States	1,009	87,256	100.0			\$221,308,563	100.0			\$112,742,159	100.0			107.7	44.3	43.9	139.4	57.2	52.3	162.3	52.4	72.1
New York	217	18,972	21.7	1	1	49,289,815	22.3	1	1	21,807,204	19.3	1	1	83.0	16.4	57.2	117.2	39.4	55.8	114.7	24.6	72.3
Pennsylvania	84	11,025	12.6	4	2	31,351,312	14.2	2	2	17,816,414	15.8	2	2	41.0	17.2	20.3	64.0	19.4	37.4	130.2	19.6	92.4
New Jersey	69	11,099	12.7	3	4	28,365,777	12.8	3	5	13,939,852	12.4	4	5	183.4	77.1	60.1	276.5	105.5	83.2	249.0	101.1	73.5
Massachusetts	83	14,507	16.6	2	3	28,142,889	12.7	4	4	15,408,069	13.7	3	4	178.9	64.9	69.1	168.3	77.2	51.4	194.0	80.0	63.3
Illinois	143	9,641	11.0	5	5	26,826,177	12.1	5	3	13,197,729	11.7	5	3	59.4	57.2	1.4	120.4	60.6	37.2	76.1	45.8	20.8
Ohio	115	8,073	9.3	6	6	18,776,769	8.5	6	6	11,550,891	10.2	6	6	114.0	57.9	35.5	188.7	70.4	69.4	264.8	82.8	99.6
Connecticut	41	3,505	4.0	7	7	9,824,373	4.4	7	8	4,613,069	4.1	7	7	264.7	105.3	77.6	210.1	98.9	55.9	286.3	111.0	83.1
Indiana	42	3,073	3.5	8	8	7,717,642	3.5	8	10	4,024,258	3.6	8	9	248.8	117.0	60.7	386.6	170.1	80.1	401.9	124.9	123.2
Rhode Island	12	1,601	1.8	9	9	6,410,020	2.9	9	7	1,814,684	1.6	11	10	85.3	13.6	63.1	25.4	17.9	6.3	85.6	28.0	45.0
Wisconsin	30	1,409	1.6	10	10	3,835,800	1.7	10	9	2,385,221	2.1	9	8	167.4	17.0	128.5	315.2	20.1	245.7	322.1	9.7	284.8
Missouri	20	1,060	1.2	12	11	3,250,535	1.5	11	11	2,146,245	1.9	10	11	98.9	33.3	49.2	256.9	86.7	91.1	286.2	89.2	104.1
Michigan	40	1,218	1.4	11	12	2,326,999	1.1	12	13	1,296,511	1.1	12	13	562.0	130.2	187.5	431.3	231.5	60.3	406.6	217.9	59.4
California	27	435	0.5	13	13	1,612,983	0.7	13	12	684,867	0.6	13	12	82.8	7.9	69.3	190.1	60.7	80.6	247.7	20.2	189.3
Delaware	4	162	0.2	16	22	606,651	0.3	14	22	313,475	0.3	14	22									
Minnesota	13	187	0.2	15	14	526,101	0.2	15	14	305,918	0.3	15	14	10.0			130.7	24.1	86.0	188.7	29.1	123.6
West Virginia	5	137	0.2	18	24	398,331	0.2	16	30	263,136	0.2	16	29									
New Hampshire	6	193	0.2	14	19	387,843	0.2	17	19	233,236	0.2	17	20				113.2	158.7	-17.6	133.0		
Kentucky	4	117	0.1	21	20	228,927	0.1	18	18	127,836	0.1	18	17				94.1	34.7	44.1			
Iowa	9	64	0.1	23	25	199,851	0.1	19	23	125,353	0.1	19	23									
Tennessee	5	99	0.1	22	28	174,306	0.1	21	25	122,478	0.1	20	25									
North Carolina	3	120	0.1	20		149,591	0.1	22		53,033	(²)	25										
Maryland	7	121	0.1	19	15	147,098	0.1	23	15	93,483	0.1	22	15	-21.9	-24.8	3.9	-44.9	-34.7	-15.7	-40.0	-29.5	-14.8
Washington	4	51	0.1	24	29	126,044	0.1	24	31	67,916	0.1	23	31									
All other states	26	387	0.4			633,129	0.3			351,281	0.3											

¹ Percentages are based on figures in Table 28. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.
² Less than one-tenth of 1 per cent.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the industry during 1909 was 105,600, of whom 87,256, or 82.6 per cent, were wage earners; 4,121, or 3.9 per cent, proprietors and officials; and 14,223, or 13.5 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 23,984, or 22.7 per cent, were females. The average number of children

under 16 years of age employed as wage earners was only 803.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	105,600	81,616	23,984
Proprietors and officials.....	4,121	4,055	66
Proprietors and firm members.....	439	428	11
Salaried officers of corporations.....	997	979	18
Superintendents and managers.....	2,685	2,648	37
Clerks.....	14,223	10,431	3,792
Wage earners (average number).....	87,256	67,130	20,126
16 years of age and over.....	86,453	66,622	19,831
Under 16 years of age.....	803	508	295

The average number of wage earners in each state for 1909, 1904, and 1899 is given in Table 28. The distribution of the average number by sex and age is not shown for the individual states, but Table 29 gives, for 1909, such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported in 21 of the states for which separate figures are shown, the largest number, 4,890, being reported in New Jersey, and the next largest number, 3,492, in Massachusetts. Most of the wage earners under 16 years of age were reported from Connecticut, Massachusetts, New Jersey, and Pennsylvania.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

Table 5 shows the average number of wage earners in the industry distributed according to age and in

the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	105,600	100.0	71,485	100.0	47.7
Proprietors and firm members.....	439	0.4	400	0.6	9.8
Salaried employees.....	17,905	17.0	10,619	14.9	68.6
Wage earners (average number).....	87,256	82.6	60,466	84.6	44.3

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	87,256	100.0	80,486	100.0	42,013	100.0
16 years of age and over..	86,453	99.1	59,878	99.0	41,418	98.6
Male.....	66,622	76.4	48,976	81.0	34,462	82.0
Female.....	19,831	22.7	10,902	18.0	6,956	16.6
Under 16 years of age.....	803	0.9	588	1.0	595	1.4

The proportion of women employed as wage earners increased from 16.6 per cent of the total in 1899 to 22.7 per cent in 1909. The proportion of males over 16 years of age decreased during the same period from 82 per cent to 76.4 per cent and the proportion of children from 1.4 per cent to nine-tenths of 1 per cent.

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 12 states in which an average of 500 or more wage earners were employed during the year.

STATE.	Average number during the year.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909 ¹											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	87,256	77,444	79,193	80,779	81,699	83,229	85,117	86,080	88,133	91,822	95,496	99,239	98,868
Connecticut.....	3,505	3,517	3,544	3,483	3,268	<i>3,216</i>	3,220	3,272	3,376	3,567	3,656	3,877	4,062
Illinois.....	9,641	<i>8,112</i>	8,649	9,336	9,473	9,615	9,864	9,714	10,022	10,393	10,814	11,273	8,427
Indiana.....	3,073	<i>2,691</i>	2,735	2,769	2,795	2,841	2,854	2,999	3,138	3,483	3,598	3,526	3,447
Massachusetts.....	14,507	<i>12,259</i>	12,636	12,996	13,444	13,855	14,394	14,910	15,245	15,387	15,754	16,302	16,926
Michigan.....	1,218	1,207	1,300	1,255	1,269	1,345	1,340	1,058	<i>1,051</i>	1,086	1,201	1,212	1,297
Missouri.....	1,060	957	<i>941</i>	953	999	1,036	1,097	1,094	1,071	1,121	1,111	1,149	1,193
New Jersey.....	11,099	<i>10,295</i>	10,673	10,535	10,462	10,612	10,878	11,075	11,303	11,286	11,618	12,034	12,418
New York.....	18,972	<i>16,653</i>	16,991	17,482	17,900	18,231	18,550	18,799	18,890	19,792	20,725	21,728	21,912
Ohio.....	8,073	<i>6,967</i>	7,264	7,450	7,491	7,592	7,698	7,790	7,967	8,758	9,158	9,285	9,458
Pennsylvania.....	11,025	10,079	<i>9,692</i>	9,717	9,755	9,993	10,238	10,486	10,979	11,746	12,439	13,236	13,940
Rhode Island.....	1,601	1,505	1,511	1,510	1,509	1,532	1,576	<i>1,497</i>	1,618	1,658	1,737	1,767	1,796
Wisconsin.....	1,409	1,296	<i>1,287</i>	1,293	1,309	1,292	1,288	1,411	1,453	1,464	1,522	1,620	1,674

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the industry as a whole during any month of 1909 was 99,239 in November, and the smallest number, 77,444, in January, the minimum number being equal to 78 per cent of the maximum. In 1904 the maximum number, 62,181, was shown for January, and the minimum number, 59,265, for August, the latter num-

ber being equal to 95.3 per cent of the former. There was a continuous gain from month to month in the number of wage earners employed in 1909 from January to November, inclusive, followed by a slight decrease in December. In 9 of the 12 states shown in the table the month of maximum employment was December.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for such months, are given for a larger number of states in Table 29.

Prevailing hours of labor.—In Table 7 the wage earners in the industry in 1909 have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	87,258	1,114	13,809	20,781	45,538	6,874	40	
Connecticut.....	3,505	7	592	2,633	273	90	6	
Illinois.....	9,641	186	8,172	734	453	90	6	
Indiana.....	3,073	17	164	184	1,772	936	6	
Massachusetts.....	14,507	266	395	922	12,851	93	6	
Michigan.....	1,218	4	26	236	310	63	6	
Missouri.....	1,060	27	229	636	150	6	6	
New Jersey.....	11,989	147	107	4,160	6,581	104	20	
New York.....	18,972	164	2,789	2,170	13,048	821	14	
Ohio.....	8,073	20	1,086	2,430	3,071	1,452	14	
Pennsylvania.....	11,025	12	705	7,853	1,772	683	6	
Rhode Island.....	1,001	1	6	153	1,409	27	6	
Wisconsin.....	1,409	7	41	351	939	71	6	

More than three-fourths (76 per cent) of the wage earners employed in the industry in 1909 were in establishments where the prevailing number of hours per week was either 54, or between 54 and 60. Of the remainder 17.2 per cent were in establishments where the prevailing hours of employment were less

than 54 per week, and 6.8 per cent in establishments where the prevailing hours were 60 or more per week.

By far the largest number of the wage earners in the industry, 45,538, or 52.2 per cent of the total number, were employed in establishments where the prevailing hours per week were between 54 and 60. This was also the most prevalent working time in all but four of the individual states for which figures are given. In Illinois the group working between 48 and 54 hours per week was the most important; in Missouri and Pennsylvania the group working 54 hours; and in Michigan that working 60 hours.

Character of ownership.—Table 8 presents statistics for 1909 and 1904 with respect to the character of ownership of establishments manufacturing electrical machinery, apparatus, and supplies in the United States.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	1,009	784	\$221,308,563	\$140,809,389
Individual.....	178	153	4,808,989	4,738,694
Firm.....	111	107	3,411,521	2,293,436
Corporation.....	720	524	213,088,053	133,777,339
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	17.6	19.5	2.2	3.4
Firm.....	11.0	13.6	1.5	1.6
Corporation.....	71.4	66.8	96.3	95.0

Establishments owned by corporations constituted more than two-thirds of the total number of establishments reported, and the value of their products represented 96.3 per cent of the total value in 1909 and 95 per cent in 1904.

Table 9 gives statistics for establishments under each form of ownership for the 12 leading states.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	178	111	720	1,892	1,167	84,397	\$4,808,989	\$3,411,521	\$213,088,053	\$2,577,833	\$1,857,250	\$108,307,076
Connecticut.....	5	1	35	29	(X)	3,483	49,504	(X)	9,774,869	30,098	(X)	4,582,976
Illinois.....	22	16	105	162	92	9,387	516,291	458,848	25,851,038	360,184	232,430	12,605,115
Indiana.....	4	5	33	6	26	3,041	9,635	54,515	7,553,492	5,879	32,923	3,985,456
Massachusetts.....	16	8	59	203	233	14,071	464,517	441,672	27,236,700	245,905	237,304	14,924,860
Michigan.....	10	6	24	28	26	1,164	79,833	111,185	2,135,981	46,061	57,034	1,193,416
Missouri.....	4	2	14	123	(X)	937	200,423	(X)	3,050,112	180,876	(X)	2,025,070
New Jersey.....	10	5	54	76	55	10,968	113,430	391,821	27,890,126	50,038	233,038	13,646,776
New York.....	52	20	145	428	284	18,260	1,338,210	625,370	47,326,035	945,637	391,644	20,469,973
Ohio.....	18	13	84	109	109	7,855	231,352	340,941	18,204,476	120,989	193,926	11,235,976
Pennsylvania.....	10	13	61	314	153	10,558	1,342,734	557,607	29,450,911	370,416	236,143	17,209,850
Rhode Island.....	1	2	9	(X)	28	1,573	(X)	46,146	6,363,874	(X)	22,309	1,792,376
Wisconsin.....	5	5	20	21	23	1,365	54,915	55,272	3,725,613	30,379	30,770	2,324,072

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted, and the figures for the group with which they have been combined are printed in italics.

In 1909, 1,692 wage earners, or 1.9 per cent of the total, were employed in establishments under individual ownership; 1,167, or 1.3 per cent, in those under firm ownership; and 84,397, or 96.7 per cent, in those owned by corporations.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for establishments manufacturing electrical machinery, apparatus, and supplies, the establishments in the industry being grouped according to the value of their products.

Of the 1,009 establishments reported for 1909, 31 manufactured products valued at \$1,000,000 or over. In 1904 there were 22 establishments of this class out of a total of 784. While such establishments represented but a comparatively small proportion of the total number at both censuses, they reported 57.1 per cent of the total value of products in 1909, and 60.5 per cent in 1904.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	1,009	784	\$221,308,563	\$140,809,369
Less than \$5,000.....	150	94	395,175	247,750
\$5,000 and less than \$20,000.....	287	246	3,209,873	2,747,791
\$20,000 and less than \$100,000.....	309	278	14,715,392	13,231,592
\$100,000 and less than \$1,000,000.....	232	144	76,612,783	39,427,942
\$1,000,000 and over.....	31	22	126,375,340	85,154,294
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	14.9	12.0	0.2	0.2
\$5,000 and less than \$20,000.....	28.4	31.4	1.5	2.0
\$20,000 and less than \$100,000.....	30.6	35.5	6.6	9.4
\$100,000 and less than \$1,000,000.....	23.0	18.4	34.6	28.0
\$1,000,000 and over.....	3.1	2.8	57.1	60.5

The average value of products per establishment increased from \$179,604 in 1904 to \$219,335 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$94,353 to \$111,737. The average number of wage earners per establishment increased from 77 in 1904 to 86 in 1909.

Table 11 gives a classification of establishments, according to the number of wage earners employed, for the leading states in the industry.

In 1909, 2.2 per cent of the establishments reported employed no wage earners; 33 per cent employed from 1 to 5; 27.2 per cent from 6 to 20; 24.1 per cent from 21 to 100; 11.6 per cent from 101 to 500; and only 2 per cent more than 500. Of the total number of wage earners, 4.6 per cent worked in establishments which employed 20 or less; 13 per cent in establishments employing 21 to 100; 27.4 per cent in those employing 101 to 500; and 55 per cent in establishments employing over 500 each. The 11 establishments in which more than 1,000 wage earners were employed reported 48 per cent of the total number of wage earners.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
	Es-tab-lish-ments.	Wage earners (average number)	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.	1,009	87,256	22	333	893	274	3,095	152	4,867	81	6,490	90	14,212	27	9,673	9	6,119	11	41,907
Connecticut.....	41	3,505	1	11	39	5	53	5	158	4	339	13	1,975	1	371	1	570	.....	.....
Illinois.....	143	9,641	5	55	145	42	469	17	529	14	966	6	699	1	437	1	665	2	5,731
Indiana.....	42	3,073	.....	13	24	9	87	7	225	7	534	3	480	2	854	1	869	.....	.....
Massachusetts.....	83	14,507	2	14	40	22	271	19	664	11	841	10	1,754	3	1,070	.....	.....	2	9,867
Michigan.....	40	1,218	2	14	31	12	117	7	238	1	51	3	431	1	350	.....	.....	.....	.....
Missouri.....	20	1,060	.....	7	22	7	76	.....	.....	1	54	4	565	1	340	.....	.....	.....	.....
New Jersey.....	69	11,099	.....	11	34	23	293	14	479	3	226	7	1,213	6	2,161	2	1,297	3	5,396
New York.....	217	18,972	4	86	224	64	677	28	848	16	1,147	15	2,327	1	457	1	638	2	12,654
Ohio.....	115	8,073	1	35	79	29	337	15	448	12	834	15	2,446	6	1,944	1	809	1	1,176
Pennsylvania.....	84	11,025	4	20	59	24	293	14	444	10	678	8	1,294	2	637	1	537	1	7,083
Rhode Island.....	12	1,601	.....	4	10	1	6	2	53	.....	.....	3	500	1	298	1	734	.....	.....
Wisconsin.....	30	1,409	.....	13	41	7	79	5	189	2	124	1	222	2	754	.....	.....	.....	.....

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$201,771,157, distributed as follows: Cost of materials, \$108,566,404, or 53.8 per cent; wages, \$49,381,145, or 24.5 per cent; salaries, \$20,193,395, or 10 per cent; and miscellaneous expenses, made up of expenditures for advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$23,630,213, or 11.7 per cent. These proportions, as may be seen by comparing the items in Table 29, vary somewhat in the several states.

Engines and power.—The amount of power used in the industry was first reported at the census of 1889. Table 1 shows that the total horsepower used increased from 7,494 in 1889 to 158,768 in 1909. Table 12 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the industry increased from 43,674 horsepower in 1899 to 158,768 horsepower in 1909, or 263.5 per cent. Steam engines still supply the greater part of the power used in the industry, although such power represented a smaller proportion of the total primary power in 1909 than in 1899. Some part of this decrease in the proportion of steam power is due to the great increase that took place during the decade in rented electric power.

The horsepower of electric motors used for distributing power by means of current generated in the establishments in the industry shows an increase from

20,182 horsepower in 1899 to 114,495 horsepower in 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	6,598	2,896	332	158,788	105,378	43,674	100.0	100.0	100.0
Owned.....	601	565	332	107,764	81,180	36,608	67.9	77.0	83.8
Steam.....	410	395	263	99,883	77,009	34,018	62.9	73.1	77.9
Gas.....	166	111	52	6,753	2,940	1,695	4.3	2.8	3.9
Water wheels.....	22	52	17	1,078	1,155	835	0.7	1.1	1.9
Water motors.....	3	7	(¹)	36	26	(¹)	(²)	(²)	.....
Other.....				14	50	60	(²)	(²)	0.1
Rented.....	5,995	2,331	(¹)	51,004	24,196	7,066	32.1	23.0	16.2
Electric.....	5,995	2,331	(¹)	50,045	21,313	4,074	31.5	20.2	9.3
Other.....				959	2,883	2,992	0.6	2.7	6.9
Electric motors	22,850	8,472	1,643	164,540	81,753	24,256	100.0	100.0	100.0
Run by current generated by establishment.....	16,655	6,141	1,643	114,495	40,440	20,182	69.6	65.5	83.2
Run by rented power.....	5,995	2,331	(¹)	50,045	21,313	4,074	30.4	34.5	16.8

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 13 shows statistics of power used during 1909 by the establishments in the 12 leading states.

New York and Pennsylvania together reported 87,642 horsepower, or 55.2 per cent of the aggregate for the industry. Steam power was the most important form of primary power used in 9 of the 12 states shown separately, rented electric power ranking second. In Michigan, Missouri, and Pennsylvania rented electric power ranked first and steam power second. The largest amount of steam power used by any state was 33,854 horsepower, by New York, which state also reported the greatest amount of rented electric power. Gas and other internal-combustion engines were used to some extent by 11 of the 12 states named in the table, Ohio leading with 2,306 horsepower, or 34.1 per cent of the total.

Fuel consumed.—Bituminous coal was the principal class of fuel used, 632,870 short tons being consumed during 1909. Gas and oil were also used to a considerable extent, the largest quantity of the former being reported for Ohio, and of the latter for New York.

STATE.	Number of establishments reporting. Total horsepower.		PRIMARY HORSEPOWER.					Rented.		ELECTRIC HORSEPOWER.		FUEL USED.					
			Owned by establishments reporting.							Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.					Electric.	Other.					Anthracite (long tons).	Bituminous (short tons).
United States.....	613	158,768	107,764	69,883	6,753	1,114	14	50,045	959	164,540	114,485	87,096	632,870	20,123	2,013	104,467	1,761,869
Connecticut.....	39	4,457	3,385	3,040	27	318	.....	1,032	40	2,117	1,085	485	18,771	.....	119	257	3,229
Illinois.....	115	11,636	9,535	9,258	277	.....	.....	2,018	83	10,656	8,638	166	71,903	5,720	1	1,100	235,983
Indiana.....	37	5,285	4,705	4,407	284	.....	14	580	.....	2,388	1,808	702	21,296	32	.....	4,086	81,180
Massachusetts.....	80	14,835	12,939	12,545	214	180	.....	1,820	76	29,188	27,368	7,946	103,916	4,154	40	27,066	241,011
Michigan.....	37	1,355	651	500	151	.....	.....	704	.....	888	184	67	3,492	185	.....	623	13,292
Missouri.....	20	1,180	531	500	31	.....	.....	642	7	1,422	790	.....	5,977	16	1	610	6,156
New Jersey.....	62	11,326	9,679	9,341	133	205	.....	1,544	103	8,691	7,147	26,633	45,919	549	30	3,248	74,505
New York.....	196	53,813	34,105	33,854	233	18	.....	19,485	223	71,599	52,114	44,898	139,883	5,303	36	34,605	80,966
Ohio.....	105	11,959	8,627	6,306	2,306	15	.....	3,200	132	10,829	7,629	1,063	65,015	2,443	.....	6,452	615,288
Pennsylvania.....	80	33,829	16,196	14,332	1,844	20	.....	17,576	57	19,853	2,277	3,876	116,955	946	.....	10,222	131,782
Rhode Island.....	11	2,837	2,798	2,728	.....	70	.....	31	8	414	383	470	16,932	30	.....	5,238	807
Wisconsin.....	29	2,333	2,067	1,910	157	.....	.....	261	5	4,023	3,762	345	14,467	729	14	6,282	3,974
All other states.....	102	3,923	2,546	1,162	1,096	288	.....	1,152	225	2,462	1,310	445	8,344	16	1,772	4,688	293,816

SPECIAL STATISTICS RELATING TO PRODUCTS.

So many different kinds of machines, apparatus, supplies, and fixtures are manufactured for use in the generation and utilization of electricity that it was impracticable to secure separate statistics of the number and value of each class of articles produced, and the inquiries were therefore confined to the most important and distinctive articles or groups of articles.

Table 14 shows in some detail the statistics for 1909, 1904, and 1899 relative to the manufacture of the different kinds or groups of electrical machinery, apparatus, and supplies for which separate totals were compiled at the census of 1909. The figures given represent not only the manufacture of such products by

establishments in the industry, but also that reported by establishments in other industries.

In reporting the totals for the several groups shown in this table, it is improbable that all establishments classified their products in exactly the same way. For example, some establishments probably reported various articles as "sockets, receptacles, bases, etc.," which other establishments reported as "circuit fittings of all kinds," etc. While these variations in the reports do not affect the statistics for the more important and well-defined products, such as dynamos, transformers, and motors, they probably do, in a measure, destroy the comparability of the figures

for some of the less distinctive products. The percentages of increase from census to census in the various products are, therefore, not shown in Table 14.

Table 14	PRODUCT.	1909	1904	1899
	Total value	\$243,965,093	\$159,551,402	\$105,831,865
	Dynamos:			
	Number.....	16,791	15,080	10,527
	Kilowatt capacity.....	1,495,950	998,182	578,124
	Value.....	\$13,081,048	\$11,084,234	\$10,472,576
	Dynamotors, motor generators, boosters, rotary converters, and double-current generators:			
	Transformers.....	\$3,154,733	\$1,740,534	\$379,747
	Switchboards, panel boards, and cut-out cabinets.....	\$8,801,019	\$4,468,567	\$2,962,871
	Motors:			
	For industrial power—			
	Number.....	504,030	206,343	159,780
	Horsepower.....	2,738,418	1,493,012	1,221,482
	Value.....	\$32,087,482	\$22,370,626	\$19,505,504
	For automobiles—			
	Number.....	243,423	79,877	35,604
	Horsepower.....	1,683,677	678,910	515,705
	Value.....	\$18,306,451	\$13,120,948	\$7,551,480
	For fans—			
	Number.....	2,796	1,819	3,017
	Horsepower.....	12,471	19,907	8,220
	Value.....	\$294,152	\$152,685	\$192,030
	For elevators—			
	Number.....	199,113	102,535	97,577
	Horsepower.....	178,033	30,796	12,766
	Value.....	\$2,450,739	\$1,168,254	\$1,055,369
	For railways, and miscellaneous services, including value of parts and supplies—			
	Number.....	4,988	1,333	385
	Horsepower.....	63,585	13,398	6,730
	Value.....	\$1,188,653	\$638,473	\$2,523,901
	Storage batteries, including value of parts and supplies:			
	Weight of plates in pounds.....	53,710	20,779	23,197
	Value.....	795,652	750,001	678,061
	Primary batteries, including value of parts and supplies:			
	Number.....	\$9,847,487	\$7,290,266	\$8,182,724
	Value.....			
	Arc lamps:			
	Number.....			
	Value.....			
	Searchlights, projectors, and focusing lamps.....			
	Incandescent lamps:			
	Carbon filament.....			
	Tungsten.....			
	Gem, tantalum, glower, and vacuum and vapor lamps.....			
	Decorative and miniature lamps, X-ray bulbs, vacuum tubes, etc...)			
	Sockets, receptacles, bases, etc.			
	Electric-lighting fixtures of all kinds			
	Telegraph apparatus.....			
	Telephone apparatus.....			
	Insulated wires and cables.....			
	Electric conduits.....			
	Annunciators—domestic, hotel, and office.....			
	Electric clocks and time mechanisms.....			
	Fuses.....			
	Lightning arresters.....			
	Rheostats and resistances.....			
	Heating, cooking, and welding apparatus.....			
	Electric flatirons.....			
	Electric measuring instruments.....			
	Electrical therapeutic apparatus.....			
	Magneto-ignition apparatus, sparks, coils, etc.....			
	Electric switches, signals, and attachments.....			
	Circuit fittings of all kinds.....			
	All other products.....			

¹ Figures for 1909 include electrical machinery, apparatus, and supplies to the value of \$22,656,530, made by establishments engaged primarily in the manufacture of wire; foundry and machine-shop products; gas and electric fixtures, and lamps and reflectors; rubber boots and shoes; brass and bronze products; rubber goods, "not elsewhere specified," and by establishments in 26 other industries. Figures for 1904 include products to the value of \$18,742,033, and figures for 1899 include products valued at \$13,397,430 made by establishments not engaged primarily in the manufacture of electrical machinery, apparatus, and supplies.

² Not reported separately.

Table 15 shows, so far as possible, the value of the different electrical machines and appliances manufactured in 1909 as subsidiary products by establishments in other industries. These figures are included in the totals shown in Table 14.

Table 15	SUBSIDIARY PRODUCTS: 1909	Value.
	Total	\$22,656,530
	Dynamos, dynamotors, generators, boosters, rotary converters, and double-current generators, and parts and supplies.....	2,111,542
	Switchboards, for light and power.....	224,452
	Motors and parts and supplies.....	1,213,761
	Electric-lighting fixtures.....	4,097,226
	Insulated wires and cables.....	11,374,165
	Rheostats and resistances.....	17,425
	Magneto-ignition apparatus.....	79,183
	All other electrical machinery, apparatus, and supplies and "all other products".....	3,504,416
	Custom work and repairing.....	34,360

Dynamos.—Dynamos are, in one sense, the most important single class of apparatus for which separate statistics are shown, in that they are necessary to generate the electrical energy which other classes of electrical machinery and apparatus are designed to distribute and utilize.

Table 16 shows the number, capacity, and value of the total production of direct and of alternating current dynamos manufactured in 1909, 1904, and 1899.

Table 16	Census.	Number.	Capacity (kilowatts).	Value.
Dynamos, total	1909	16,791	1,405,950	\$13,081,048
	1904	15,080	998,182	\$11,084,234
	1899	10,527	578,124	\$10,472,576
Direct current	1909	13,882	414,222	\$4,710,524
	1904	13,756	640,350	\$6,973,130
	1899	9,182	321,451	\$6,297,925
Alternating current	1909	2,909	991,728	\$8,370,524
	1904	1,324	356,832	\$4,111,104
	1899	1,345	256,673	\$4,174,651

During the decade ending with 1909 there was an increase of 59.5 per cent in the number, and of 143.2 per cent in the total capacity, of dynamos produced. The average capacity per machine increased from 55 kilowatts in 1899 to 84 kilowatts in 1909. The increase in average capacity is confined to alternating-current machines, as there was a decrease for the decade in that of the direct-current machines. Alternating-current dynamos more than doubled in number, value, and aggregate kilowatt capacity during the five years from 1904 to 1909, and the average capacity per machine increased from 269 kilowatts in 1904 to 341 kilowatts in 1909. During the same period the average capacity of direct-current machines decreased from 47 to 30 kilowatts.

Transformers.—Roughly speaking, a transformer consists essentially of an induction coil in which the primary wire is long and thin, with many turns, as compared with the secondary wire, which is short and thick and has few turns; or these conditions may be reversed, making the primary wire thick and the secondary wire thin. This winding varies in accordance with the particular uses for which the transformer is required. They are used both for stepping-up the electromotive force to a voltage suitable for economical transmission, and for stepping it down again to safe pressures at the point of consumption. Table 17 shows the total production of transformers in 1909, 1904, and 1899, and separate statistics of apparatus

having a capacity of less than 50 kilowatts, and for those having a capacity of 50 kilowatts and over for the years 1909 and 1904. The figures showing the capacity of individual transformers were not reported for 1899.

	Census.	Number.	Capacity (kilowatts).	Value.
Transformers, total.....	1909	78,729	1,635,428	\$8,801,016
	1904	66,698	728,181	4,468,587
	1899	36,513	305,588	2,962,871
Under 50 kilowatts.....	1909	72,776	577,408	4,184,832
	1904	63,311	350,174	3,292,207
50 kilowatts and over.....	1909	3,953	1,058,021	4,616,187
	1904	3,387	378,007	1,176,360

¹ Includes transformers to the value of \$2,700 for which number and capacity were not reported.

Table 17 includes the large transformers used in central stations as well as those used on electric lines. There was a decided increase in the number and value of the transformers manufactured and a much greater increase in their capacity in 1909 as compared with those produced in 1899. The number increased 110.1 per cent, the capacity 435.2 per cent, and the value 197 per cent. More than nine-tenths (94.8 per cent) of the transformers in 1909 were of comparatively small size, having a capacity of less than 50 kilowatts. While the 3,953 transformers with a capacity of 50 kilowatts and over manufactured during 1909 formed only 5.2 per cent of the total number, their total capacity amounted to 1,058,021 kilowatts, or 64.7 per cent of the total kilowatt capacity of all transformers produced during the year. Some idea of increasing size of transformers may be had from the fact that in 1909 the average capacity of the transformers of 50 kilowatts and over was 267.7 kilowatts, as compared with an average of 111.6 kilowatts in 1904.

Switchboards.—Table 18 shows the value of the switchboards, panel boards, and cut-out cabinets for light and power work manufactured during 1909, 1904, and 1899 in eight of the leading states for which comparable figures are available.

	1909	1904	1899
Switchboards, panel boards, and cut-out cabinets, total.....	\$5,971,804	\$3,766,044	\$1,846,624
California.....	80,594	27,749	10,000
Connecticut.....	151,385	(¹)	3,700
Illinois.....	448,185	244,590	75,367
Massachusetts.....	304,502	468,689	280,602
Missouri.....	137,581	127,500	67,500
New York.....	2,789,297	1,373,366	1,055,288
Ohio.....	236,930	54,056	21,600
Pennsylvania.....	1,243,356	1,157,027	353,043
All other states.....	569,974	313,067	23,464

¹ Included in "all other states."

Each system of centralized electrical supply requires a switchboard for the manipulation of its circuits and to connect the sources of supply with the consumer. The switchboards shown in the table are those used for light and power work and differ distinctly from the switchboards used in telegraphic and telephonic work,

which are included in the total shown in Tables 24 and 25 for telegraph and telephone instruments, supplies, etc.

At one time the manufacture of switchboards for light and power stations was carried on by a large number of establishments, and their production required little else than skillful working in hardwood. At present switchboards of the above type are made of slate or marble slabs with framework of copper, iron, and steel, and involve many problems of apparatus adjustment. For this reason the large electrical manufacturing companies have virtually taken over the construction of the larger switchboards for the plants which they equip, and have made a business also of supplying many of the indicating and recording instruments used in connection with the boards. The value of these appurtenances of light and power work increased 103.9 per cent from 1899 to 1904, and 223.4 per cent during the decade 1899–1909. New York and Pennsylvania were the leading states in this branch of manufacture, reporting 67.5 per cent of the total value of these products in 1909, as compared with 76.3 per cent in 1899.

Motors.—Table 19 shows the number, capacity, and value of electric motors manufactured in 1909, 1904, and 1899.

	Census.	Number.	Capacity (horsepower).	Value.
Motors, total.....	1909	504,030	2,733,418	\$32,087,482
	1904	208,343	1,493,012	22,370,626
	1899	158,780	1,221,482	19,505,504
For industrial power.....	1909	243,423	1,683,677	18,306,451
	1904	79,877	678,910	13,120,948
	1899	35,604	515,705	7,551,480
Direct current.....	1909	100,714	676,682	7,787,043
	1904	54,242	382,997	10,254,854
	1899	29,615	378,329	5,786,052
Alternating current.....	1909	142,709	1,006,995	10,519,408
	1904	25,635	295,913	2,366,094
	1899	5,989	137,376	1,765,428
For automobiles.....	1909	2,796	12,471	294,152
	1904	1,810	19,907	152,685
	1899	3,017	8,220	192,030
For fans.....	1909	199,113	178,033	2,450,739
	1904	102,535	30,796	1,168,254
	1899	97,577	12,766	1,055,369
For elevators.....	1909	4,988	63,585	1,188,653
	1904	1,333	13,398	638,473
	1899	385	6,730	2,523,901
For railways and miscellaneous uses, including value of parts and supplies for all motors.	1909	53,710	795,652	9,847,487
	1904	20,779	750,001	7,290,266
	1899	23,197	678,061	8,182,724

¹ Includes motor parts and supplies valued at \$2,794,779. To what extent such values were included at prior censuses is unknown, since no data bearing upon the point were collected.

² Includes motors valued at \$2,008,455 for which the number and horsepower were not reported; and 60 motors valued at \$261,722 for which the horsepower was not reported.

The number, capacity, and value of motors for transforming electric current into mechanical power were very much larger in 1909 than in 1899. The number of motors of all kinds produced increased 215.5 per cent during the decade, their capacity 123.8 per cent, and their value 64.5 per cent. The largest increases are shown in the case of the motors for

operating stationary machinery, which are designated in the table as motors for industrial power. During the decade ending with 1909 the number of these motors for distributing power to be used industrially increased 583.7 per cent, their capacity 226.5 per cent, and their value 142.4 per cent. The average capacity of these motors decreased from 14 horsepower in 1899 to 7 horsepower in 1909. Of the motors designated to be used for industrial purposes the largest increases are shown in the case of those operated by alternating current. The total capacity of such motors increased from 137,376 horsepower in 1899 to 1,006,995 in 1909, though the average capacity per machine decreased from 23 horsepower in 1899 to 7 horsepower in 1909. At the census of 1899 only the largest motors were of the alternating current type, but at the census of 1909 alternating current was so generally used that the average capacity of motors of both types was about the same. In sections where electric power is available, new manufacturing establishments generally use it in preference to steam or water. The general report on manufactures shows a large increase in the use of electric power. In 1909 there were 388,854 electric motors with a capacity of 4,817,140 horsepower installed in manufacturing establishments. In 1899 there were only 16,891 motors reported with a capacity of 492,936 horsepower.

The production of motors intended for other purposes did not increase so rapidly as those built for furnishing power for industrial purposes. Of the three designated varieties of motors embraced in this group, those used for the operation of fans predominate in number, capacity, and value, and during the decade 1899-1909 they increased 104.1 per cent in number, 1,294.6 per cent in capacity, and 132.2 per cent in value. The average capacity of these motors was nearly seven times as great in 1909 as in 1899, while the total horsepower was nearly fourteen times as great. The improved methods of ventilation in theaters, halls, hotels, factories, etc., have called for electric fans or blowers of larger size, so that the average capacity of fan motors increased approximately from one-tenth of 1 horsepower in 1899 to nine-tenths of 1 horsepower in 1909. In this connection it should be stated that a few of the largest manufacturers of fan motors were unable to definitely state their total capacity, and in such cases the capacity was estimated. The figures, however, are presented subject to these restrictions.

The statistics for the manufacture of electric railway motors for 1909 can not be shown separately without disclosing the operations of individual establishments, and for this reason they are combined in Table 19 with those for motors for miscellaneous uses. It may be stated, however, that the number of electric railway motors manufactured in 1909 was considerably greater than that in 1904, when 12,298 motors, with a capacity of 713,181 horsepower, were reported, valued at \$4,949,795.

Batteries.—Table 20 shows the number and value of primary batteries, and the value of storage batteries and of parts and supplies, produced in 1909, 1904, and 1899.

Table 20	PRODUCT.	Census.	Number.	Value.
	Batteries, total.....	1909	.....	\$10,912,470
		1904	.....	4,243,893
		1899	.....	3,879,045
	Primary batteries.....	1909	34,333,531	5,312,595
		1904	6,023,162	1,028,556
		1899	2,654,765	887,383
	Dry.....	1909	33,988,881	4,583,082
		1904	4,838,361	513,026
		1899	1,946,688	316,013
	Liquid ¹	1909	344,650	729,513
		1904	1,734,801	515,530
		1899	708,077	² 571,370
	Storage batteries.....	1909	.....	4,243,984
		1904	.....	1,569,371
		1899	.....	2,559,601
	Parts and supplies.....	1909	.....	1,055,891
		1904	.....	1,645,966
		1899	.....	232,061
	For primary batteries.....	1909	.....	621,666
		1904	.....	569,588
		1899	.....	232,061
	For storage batteries.....	1909	.....	434,225
		1904	.....	1,076,378
		1899	.....	(³)

¹ Includes testing batteries.

² Includes batteries to the value of \$1,500 for which number was not reported.

³ Not reported separately.

Both storage and primary batteries consist of various elements which are not always sold together as a unit by the same manufacturer, and yet it is not until these are brought together that a complete cell is constituted. In fact, many of the parts and supplies lie outside the electrical field. For example, the primary battery consists of various elements, such as the jars, zinc, copper, carbon, sulphuric acid, caustic soda, bichromate of potassium, according to the nature of the cell, on the constant renewals of which the efficiency and life of the cell depend.

The value of storage and primary batteries manufactured and of parts and supplies for the same increased 188.5 per cent during the decade. The value of primary batteries manufactured in 1909 showed an increase of 498.7 per cent over the value of those turned out in 1899, while the value of storage batteries increased but 65.8 per cent during the decade, the larger part of this increase being for the five-year period 1904-1909. Of the total value of batteries and parts and supplies produced in 1909, primary batteries represented 50.1 per cent, storage batteries 40 per cent, and parts and supplies 9.9 per cent. In 1899 the proportions were 24.1 per cent, 69.6 per cent, and 6.3 per cent, respectively.

The number of "dry" primary batteries reported in 1909 was more than seventeen times the number reported in 1899, while their total value was over fourteen times as great. The large increase in these batteries is chiefly due to the demand for such batteries for automobiles and for motor boats.

The number of "liquid" batteries reported decreased 51.3 per cent from 1899 to 1909, but their total value increased 27.7 per cent during the same period.

The most extensive use of storage batteries is in connection with central station lighting plants and electric railways.

Electric lamps and lighting fixtures.—Table 21 shows the number and value of arc lamps manufactured in 1909, 1904, and 1899.

	Census.	Number.	Value.
Arc lamps, total.....	1909	123,985	\$1,706,959
	1904	195,157	1,574,422
	1899	158,187	1,827,771
Inclosed.....	1909	118,981	1,623,299
	1904	193,409	1,544,433
	1899	134,531	1,551,290
Open.....	1909	5,004	83,660
	1904	1,748	29,989
	1899	23,656	276,481

From 1899 to 1909 there was a decrease of 34,202, or 21.6 per cent, in the number of arc lamps manufactured and a decrease of \$120,812, or 6.6 per cent, in their total value. The decrease is accounted for by the fact that, while formerly arc lamps were used almost exclusively for street lighting and other purposes, the incandescent lamps have now replaced them to an appreciable extent. The value of arc lamps was slightly greater in 1909 than in 1904, owing to the introduction of more costly types, such as the flaming arc, etc.

Arc lamps are of two kinds, open and inclosed, either of which may be of the direct or of the alternating current type. The inclosed lamps comprised by far the more important group, 96 per cent of the total number in 1909 being of this kind. Although the number of such lamps declined during the decade, the total value increased. The principal element in the superiority of the inclosed over the open type of arc lamp consists in the relation of the inner globe to the arc, whereby with a suitably restricted air inlet a long arc may be steadily maintained by a comparatively small current. In the ordinary open arc lamp the carbon sticks burn away in 10 or 12 hours, but in an inclosed lamp the cored carbons used will last from 60 to 125 hours. The small inner globe inclosing the carbon is of elongated oval shape, and is made of refractory glass, so as to resist successfully the intense heat of the arc.

There was a marked decrease from 1899 to 1909 in both the number and value of the open arc lamps, although there was an increase in both respects from 1904 to 1909.

The value of the output of searchlights, projectors, and focusing lamps (see Table 14) increased \$710,239, or 314.8 per cent, during the decade ending with 1909. The statistics for 1909 include a large number of focusing lamps used for theatrical purposes and for automobile searchlights.

One of the largest special departments of electrical production is that of incandescent lamps. The schedule of inquiry used at the census of 1909 called for statistics concerning incandescent lamps classified according to kind of filament used, while at previous censuses the classification of these lamps was according to their candlepower.

Table 22 shows the value of the different kinds of incandescent lamps so far as available, manufactured in 1909, 1904, and 1899.

KIND.	Census.	Number.	Value.
Incandescent lamps, total.....	1909		\$15,714,809
	1904		6,953,205
	1899		3,515,118
Carbon filament ¹	1909	55,038,378	6,157,066
	1904	112,711,558	6,308,299
	1899	25,320,198	3,442,183
Tungsten.....	1909	11,738,619	6,241,133
	1904	(²)	(²)
	1899		
Gem, tantalum, glower, vacuum, and vapor lamps. ¹	1909		2,715,991
	1904		395,155
	1899		
Decorative and miniature lamps, X-ray bulbs, vacuum tubes, etc.	1909		600,619
	1904		249,751
	1899		72,935

¹ "Carbon filament" lamps were first reported as such in 1909. Incandescent lamps—"16 candlepower," "below 16 candlepower," and "over 16 candlepower"—reported for 1899 and 1904. It is therefore probable that the 1904 figures, shown for comparison as "carbon filament," include a considerable number of tungsten, gem, and tantalum lamps manufactured in 1904, but not reported separately.

² Not reported separately. See Note 1.

All filament incandescent lamps reported in 1904 and 1899 have been combined in Table 22 for comparison with the "carbon filament" lamps reported for 1909, but it is probable that the group of lamps classified as "above 16 candlepower" in 1904 contained a number of high-power lamps of the tungsten, tantalum, and gem types.

"Glower lamps and parts" and "vacuum and vapor lamps" were reported separately in 1904, but for 1909 the figures for such lamps are combined with those for gem and tantalum lamps. The development of electric lamps of new forms and characteristics, requiring special fixtures for their most efficient use, has greatly stimulated this branch of manufacture, especially during the five-year period 1904-1909.

Table 23 shows the total value of electric lighting fixtures manufactured in the United States during the years 1909, 1904, and 1899, and the value produced in the individual states during 1909 and 1904.

The total value of the production of electric lighting fixtures of all kinds increased 86 per cent from 1904 to 1909, and 63.4 per cent from 1899 to 1909. The total value of electric lighting fixtures as shown in Table 23 represents only the value of those definitely reported as such, and is no doubt far less than the actual value of such products. Large quantities of electric fixtures are manufactured in connection with the production of gas and other fixtures. In some instances these are combination fixtures. The total value of products for

"gas and electric fixtures" reported at the census of 1909 was \$29,844,303. The total reported value of electric lighting fixtures in 1909 was \$6,128,282, made up of \$2,031,056 reported by establishments engaged primarily in manufacturing electrical machinery, apparatus, and supplies; \$3,927,614 by those making gas and electric fixtures, and \$169,612 reported as subsidiary products of other industries. It is probable that the total value of electric lighting fixtures produced by establishments manufacturing gas and electric fixtures was much larger than the figure reported, since many of such establishments failed fully to segregate their products.

New York was the leading state in the manufacture of electric lighting fixtures, the value of such products shown for the state in 1909 representing 42.2 per cent of the total for the country.

	Census.	Value.
Lighting fixtures, total	1909	\$6,128,282
	1904	3,294,606
	1899	3,750,670
California.....	1909	581,768
	1904	447,109
Connecticut.....	1909	265,323
	1904	397,498
Illinois.....	1909	797,579
	1904	639,405
Indiana.....	1909	173,352
	1904	
Massachusetts.....	1909	217,268
	1904	(¹)
Michigan.....	1909	62,401
	1904	
New Jersey.....	1909	234,797
	1904	(¹)
New York.....	1909	2,585,307
	1904	1,063,945
Ohio.....	1909	57,358
	1904	150,500
Pennsylvania.....	1909	312,395
	1904	406,610
Wisconsin.....	1909	199,685
	1904	
All other states.....	1909	641,049
	1904	189,539

¹ Included in "all other states."

The value of sockets, receptacles, bases, etc., shown separate from lighting fixtures in Table 14 was more than seven times as great in 1909 as in 1899.

Telegraph apparatus.—Table 24 shows statistics of telegraph apparatus manufactured in 1909, 1904, and 1899.

	1909	1904	1899
Telegraph apparatus, total	\$1,957,432	\$1,111,194	\$1,642,266
Intelligence (key, sounder, etc.):			
Number.....	83,539	76,826	199,410
Value.....	\$197,669	\$187,744	\$354,212
Police, fire, district and miscellaneous.....	\$1,126,658	\$592,070	\$1,231,167
Wireless telegraph apparatus.....	448,262	114,050	(¹)
Switchboards and telegraph parts and supplies.....	184,843	217,330	56,887

¹ Not reported separately.

During the decade 1899–1909 there was an increase of \$315,166, or 19.2 per cent, in the total value of the output of telegraph apparatus.

Commercial wire telegraph apparatus decreased 44.2 per cent in value during the decade. A large proportion of telegraphic apparatus was comprised under the heading of "police, fire, district, and miscellaneous" at each census—57.6 per cent in 1909, 53.3 per cent in 1904, and 75 per cent in 1899. The value of apparatus of this kind shows a large gain during the five years 1904–1909, the total in the latter year being nearly equal to that in 1899. Wireless telegraph apparatus, which was not reported separately for 1899, shows a large increase (293 per cent) during the period 1904–1909.

Telephone apparatus.—Table 25 shows the statistics of the telephone apparatus produced in 1909 and 1904. Comparable figures for 1899 are not available.

	Census.	Number.	Value.
Telephones, total	1909		\$14,259,357
	1904		15,863,698
Transmitters.....	1909	1,116,403	1,376,762
	1904	850,815	824,204
Receivers.....	1909	1,063,309	1,134,929
	1904	831,195	696,113
Complete sets of instruments not included in transmitters and receivers.	1909	732,697	5,103,849
	1904	887,447	6,483,418
Interior systems complete, without instruments.	1909	16,238	123,085
	1904	4,560	68,826
Central switchboards.....	1909		2,398,909
	1904		5,154,447
Private exchange boards.....	1909	2,252	369,915
	1904	3,917	564,795
Telephone parts and supplies.....	1909		3,751,908
	1904		2,071,895

There was a decrease from 1904 to 1909 in the total value of telephone apparatus produced of \$1,604,341, or 10.1 per cent. A very large proportion of other electrical apparatus, such as dynamos, motors, motor-generator sets, insulated wires and cables, conduits, etc., was required for the equipment of telephone exchanges and in connecting the stations of individual telephone subscribers with central stations. Only when due allowance is made for the value of these other classes of products used in connection with the telephone systems can an idea be formed of the total value of telephone equipment manufactured. Substantial increases were shown in the value of telephone transmitters and receivers and telephone parts and supplies produced, but for central switchboards there was a decrease of \$2,755,538, or 53.5 per cent, during the five years. Decreases were also shown in the value of complete sets of telephone instruments and of private exchange boards turned out in 1909 as compared with the value of those produced in 1904—21.3 per cent for the former and 34.5 per cent for the latter.

The products for Illinois show a decrease of more than a million dollars during the five-year period, and there were only 16 establishments in this state that reported the manufacture of telephone apparatus and supplies in 1909, as compared with 29 engaged in such manufacture at the previous census.

A considerable proportion of the total value of telephone equipment produced was that of parts and supplies. This designation embraces a wide variety of parts, such as the signaling apparatus in magneto-telephone sets, main switchboards, the apparatus in use at the subscribers' stations, and a large amount of miscellaneous apparatus.

Insulated wire and cables.—Table 26 shows the value of the production of insulated wire and cables in the different states during 1909 and 1904 and the total value only for 1899.

	Census.	Value.
Insulated wire and cables, total.....	1909 1904 1899	\$51,624,737 34,519,699 21,292,001
Connecticut.....	1909 1904	4,205,509 2,156,369
Illinois.....	1909 1904	9,487,006 3,666,313
Massachusetts.....	1909 1904	2,194,474 1,001,522
New Jersey.....	1909 1904	13,945,425 8,234,885
New York.....	1909 1904	9,485,282 10,911,897
Pennsylvania.....	1909 1904	2,796,825 2,885,052
Rhode Island.....	1909 1904	7,741,411 5,122,464
All other states.....	1909 1904	1,768,805 541,197

The value of insulated wire and cables manufactured in 1909, 1904, and 1899 constituted the largest single item in the total value of electrical machinery, apparatus, and supplies reported, representing more than one-fifth of the total value of products for the industry at each census.

Of the \$51,624,737 reported as the total value of insulated wire and cables, \$40,250,572 was reported by establishments in the industry proper, and \$11,374,165 by establishments engaged primarily in other industries. Only a small number of the establishments in the industry proper drew the wire which they insulated, while of the establishments outside the industry reporting this product the greater number were engaged primarily in wire drawing.

New Jersey, Illinois, and New York were the three states leading in this branch of the industry in 1909, reporting 63.8 per cent of the total value in that year and 66.1 per cent in 1904.

Electric measuring instruments.—Table 27 shows the value of the various kinds of electric measuring instruments for 1909 and 1904, and the total value of the production only for 1899.

	Census.	Value.
Electric measuring instruments, total.....	1909 1904 1899	\$7,800,010 5,004,763 1,842,135
Meters for consumers' circuits.....	1909 1904	5,613,838 3,585,080
Central station apparatus.....	1909 1904	1,639,202 418,998
Testing and scientific.....	1909 1904	546,970 1,000,685

The value of the output of electric measuring instruments increased \$5,957,875, or 323.4 per cent, during the decade. The value of meters manufactured for consumers' circuits increased 56.6 per cent from 1904 to 1909, and central station apparatus, 291.2 per cent during the same period.

The indicating apparatus for central stations is practically uniform throughout the country, the leading types being voltmeters, ammeters, wattmeters, and watt-hour meters; but although one or two types are predominant among the consumers' meters considerable variety exists, the kind used depending somewhat upon the system used in charging for the service.

The testing and scientific apparatus constitutes a large group of appliances, including numerous types with hundreds of varieties, employed not only in practical work, but in laboratories and in physical and scientific research as well. The value of the production of this apparatus decreased 45.3 per cent from 1904 to 1909.

Miscellaneous electrical appliances.—Referring to Table 14, it will be seen that during the decade 1899–1909 there was a gain of only \$10,682, or 4.7 per cent, in the value of annunciators turned out, although their manufacture increased 26.7 per cent during the later five-year period. The value of the output of electric clocks and time mechanisms, on the other hand, increased 166.8 per cent during the decade, and the combined value of rheostats and resistances, heating, cooking, and welding apparatus, and electric flatirons, 290 per cent.

Rheostats and resistances are a necessary adjunct to the use of heavy current for producing light and power, and large numbers are called for particularly in connection with the starting and regulation of electric motors, electric elevators, etc. Many small resistances, however, are now used in connection with delicate electrical instruments, as balance coils in telegraph service, or as shunting and ringing resistances in telephone circuits and relay signaling systems.

The production of apparatus for electric heating, cooking, and welding, and electric flatirons has increased rapidly during the past few years and has now become an important department in this industry.

Therapeutic apparatus was not reported separately in 1899, but the increase in the production from 1904 to 1909 was \$70,896, or 6.8 per cent. A large number of medical men now employ electricity almost exclu-

sively in their work, and there are numerous clinics dealing solely with the application of electricity in the treatment of disease. The equipments of some physicians are of the most elaborate and costly character, arranged in numerous separate compartments, each fitted up with its specific or distinctive devices for X-ray work, electric light baths, charged liquid baths, the application of frictional or static electricity, and for the treatment of diseases requiring the direct internal or external application of current.

Wires for the transmission of electric current, either within buildings or underground, are now almost invariably inclosed in conduits. The value of these electric conduits produced in 1909 was \$5,098,264 (see Table 14).

Underground conduits are usually of porcelain or terra cotta and are manufactured almost entirely by establishments assigned by the Bureau of the Census to the classification "pottery, terra-cotta, and fire-clay products." The value of the conduits manufactured by establishments engaged chiefly in the electrical apparatus industry given in Table 14 does not include those made in the pottery industry.

The growth in the combined value of fuses and lightning arresters during the decade was \$1,346,393, or 226.1 per cent. This increase is due not only to the general increase in the use of electricity but also to the increasing recognition of the fact that it is a policy of economy to protect all classes of apparatus against lightning or other sudden or dangerous increases of the electrical energy flowing through the circuit.

There are no figures showing production of magneto-ignition apparatus, spark coils, etc., in 1899. From 1904 to 1909 the output of such apparatus, as shown by Table 14, increased in value \$5,414,266, or nearly 800 per cent. The rapid development of the gasoline automobile has created an enormous demand for ignition apparatus to ignite the explosive mixture of the air and gasoline vapor in the cylinder.

The value of electric switches, signaling devices, and attachments increased \$4,247,952, or 376 per cent, during the decade. These appliances are auxiliary portions of telegraphic devices for conveying intelli-

gence as to the movements of trains, cars, elevators, and other transportation mechanisms.

Circuit fittings were not reported separately in 1899. It is probable that in 1909 some of these were included among "all other products," thus explaining the decrease of \$2,445,159, or 69.4 per cent, from 1904 to 1909, shown in Table 14. The general and increasing utilization of electricity for a variety of purposes has necessitated the invention and manufacture of a class of appliances to which the general name "circuit fittings" has been given to designate that which is not part of the appliance itself, or part of the generating plant, or part of the distributing circuits and pole lines, but which at the same time is required in order to enable contractors and the public to install such apparatus advantageously.

The value of "all other products" in 1909, \$39,691,708 (see Table 14), formed 16.3 per cent of the total value of products of the entire industry. Under this heading are included dynamo parts and supplies to the value of almost a million dollars; custom work and repairing to the value of \$5,692,543; and also carbons of all kinds, the value of which can not be shown separately. By far the largest item entering into the total for 1909, however, was one of \$18,995,176, representing the value of miscellaneous or unclassified forms of electrical machinery, apparatus, and supplies. These included electric mining machinery, automatic electric pumps, products based on late electrical inventions, and the making of special electrical apparatus to order; various devices and appliances for electrical use not designated on the schedule; panel and switch boxes, electric signs and flashers, electric flashlights; overhead trolley line material, trolley wheels, retrievers, gears, and pinions; various repair parts; insulating materials, such as mica, fiber, tape, etc.; and electrical supplies of various kinds. In addition to the products described above, there were others, to the value of \$12,073,102, which were not electrical in their nature and which are ordinarily the product of other industries. The most important of these products are wire, iron and steel, foundry and machine-shop products, and moving-picture apparatus.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning establishments engaged in the manufacture of electrical machinery, apparatus, and supplies are presented, by states, in Tables 28 and 29.

Table 28 shows for 1909, 1904, and 1899 the number

of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture, while Table 29 gives more detailed statistics for the industry for 1909 only.

SHIPBUILDING

SHIPBUILDING, INCLUDING BOAT BUILDING.

GENERAL STATISTICS OF THE INDUSTRY.

Scope and character of the industry.—The shipbuilding and boat-building industry includes all establishments engaged primarily in the construction or repair of ships and boats. Data for shipyards owned by the Federal Government were also collected, but these are shown separately and not included with the general totals for the industry or in those for all manufacturing industries combined. Aside from establishments assigned to the shipbuilding industry, there are a number of establishments assigned to other industries which incidentally build or repair ships or boats, and statistics as to the number and tonnage of the vessels launched by such establishments are presented in connection with the tables giving similar statistics for establishments in the shipbuilding industry.

In the statistics for the shipbuilding industry in the United States, the Bureau of the Census has distinguished between iron and steel shipbuilding and wooden shipbuilding and boat building. The former branch is further subdivided so as to distinguish (1) establishments doing chiefly new construction work

on vessels of 5 tons or over and (2) establishments doing repair work exclusively. Establishments in the wooden-shipbuilding business are subdivided into four groups: (1) Establishments engaged primarily in new construction work on vessels of 5 tons or over; (2) establishments doing repair work only; (3) establishments engaged primarily in building boats of less than 5 tons; and (4) establishments making masts, spars, and oars, and those engaged in rigging vessels. These branches and subbranches of the industry are not, however, distinguished in the tables giving statistics by states, as to do so might result in the disclosure of individual operations. There is some overlapping between the different branches and subbranches.

Summary for the United States: 1909.—Table 1 presents a summary of the statistics for establishments assigned to the shipbuilding industry, by branches and subbranches. The table does not include data for establishments operated by the Federal Government or for establishments engaged primarily in other industries, and the same is true of all tables unless otherwise expressly stated.

Table 1	Aggregate.	ESTABLISHMENTS ENGAGED PRIMARILY IN—							
		Iron and steel shipbuilding.			Wooden shipbuilding and boat building.				
		Total.	New construction. ¹	Repair work only. ²	Total.	New construction. ¹	Repair work only.	Making boats under 5 tons.	Making masts, spars, and oars, and rigging vessels.
Number of establishments.....	1,353	53	38	15	1,300	369	134	767	30
Persons engaged in the industry.....	44,949	30,041	25,940	4,101	14,905	7,486	3,507	3,742	173
Proprietors and firm members.....	1,463	21	14	7	1,442	422	110	875	35
Salaried employees.....	2,980	1,877	1,684	193	1,103	451	332	313	7
Wage earners (average number).....	40,506	28,143	24,212	3,901	12,363	6,613	3,065	2,554	141
Primary horsepower.....	88,063	57,697	(³)	(³)	30,366	(³)	(³)	(³)	(³)
Capital.....	\$126,118,489	\$100,171,936	\$88,710,172	\$11,461,764	\$25,946,553	\$12,789,297	\$7,356,816	\$5,563,121	\$237,319
Expenses.....	67,521,967	46,928,188	41,144,060	5,784,128	20,593,779	12,017,624	3,819,108	4,497,698	259,349
Services.....	29,303,132	20,128,803	17,430,889	2,697,914	9,174,329	5,229,843	2,043,180	1,813,110	88,196
Salaries.....	4,035,446	2,913,627	2,674,808	238,819	1,121,819	565,351	234,978	263,277	8,213
Wages.....	25,267,686	17,215,176	14,756,081	2,459,085	8,052,510	4,664,492	1,758,202	1,549,833	79,983
Materials.....	31,214,358	21,716,410	19,583,525	2,132,885	9,497,948	5,817,434	1,417,506	2,118,462	144,546
Miscellaneous.....	7,004,477	5,082,975	4,129,646	953,329	1,921,502	970,347	358,422	566,126	26,607
Value of products.....	73,360,315	49,617,278	42,722,549	6,894,729	23,743,037	13,494,947	4,458,128	5,457,763	332,199
Value added by manufacture (value of products less cost of materials).....	42,145,957	27,900,868	23,139,024	4,761,844	14,245,089	7,677,513	3,040,622	3,539,301	187,653

¹ On vessels of 5 tons or more.

² Includes 1 establishment making boats under 5 tons.

³ Not tabulated separately.

In 1909 there were 1,353 establishments engaged in the shipbuilding industry as a whole, which gave employment to 40,506 wage earners, to whom \$25,267,686 was paid in wages. The value of products (value of work done) was \$73,360,315, while the cost of materials was \$31,214,358, equal to 42.5 per cent of the value of products. The value added by manufacture was \$42,145,957.

It may be noted that a considerable part of the value of products for the shipbuilding industry represents the receipts for repair work. The amount of such receipts for 1909, together with other statistics as to the products of the industry, is shown in Table 27.

While the number of establishments engaged in iron and steel shipbuilding is comparatively small, these establishments in 1909 gave employment to 69.5 per

cent of the total number of wage earners in the industry as a whole and contributed 67.6 per cent of the total value of products. The average value of products per establishment for the industry as a whole in 1909 was \$54,220; but for iron and steel shipbuilding the average was \$936,175, as against \$18,264 for wooden shipbuilding and boat building. In this connection it should be noted that many small establishments engaged chiefly in building small boats or in the making of masts, spars, and oars and in rigging vessels are included in the total for wooden shipbuilding.

In the iron and steel shipbuilding industry the establishments engaged in new construction reported 86.1 per cent of the total value of products in 1909, 13.9 per cent being reported by yards doing repair work only. In the wooden shipbuilding and boat building industry the proportions of the total value of products contributed by the establishments in the four subbranches were as follows: Establishments

engaged in new construction on vessels of 5 tons or over, 56.8 per cent; those doing repair work only, 18.8 per cent; those constructing only boats of less than 5 tons, 23 per cent; and establishments making masts, spars, and oars and rigging vessels, 1.4 per cent. It may be noted that both in iron and steel shipbuilding and in wooden shipbuilding the value of repair work done in establishments engaged principally in new construction was greater than that done by establishments engaged exclusively in repair work.¹

Comparison with earlier censuses.—Table 2 summarizes the statistics of the shipbuilding industry as a whole (exclusive of Government establishments and establishments assigned to other industries) for each census from 1869 to 1909, inclusive.

¹ This can be seen by a comparison of the figures in Table 1 with the statistics of the total value of repairs to iron and steel and wooden vessels, as given in Table 28.

Table 2

	SHIPBUILDING, INCLUDING BOAT BUILDING.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	1,353	1,097	1,107	1,006	2,188	964	22.2	23.3	-0.9	10.0	-54.0	127.0
Persons engaged in the industry.....	44,949	54,424	(*)	(*)	(*)	(*)	-17.4	22.9				
Proprietors and firm members.....	1,463	1,190	(*)	(*)	(*)	(*)	112.1	20.2	78.5			
Salaried employees.....	2,980	2,480	1,405	(*)	(*)	(*)	-13.4	-20.2	8.6	111.1	(*)	(*)
Wage earners (average number).....	40,506	50,754	46,747	22,143	21,345	13,915	42.5	12.7	26.4	239.7		
Primary horsepower.....	88,063	78,127	61,797	18,192	(*)	5,136	63.1	3.7	57.3	183.7	29.9	83.0
Capital.....	\$126,118,489	\$121,623,700	\$77,341,001	\$27,262,892	\$20,979,874	\$11,463,076	5.5	-10.3	17.7	98.8		
Expenses.....	67,521,967	75,299,513	63,991,682	32,192,616	(*)	(*)	9.2	-10.1	21.4	87.9	12.3	29.7
Services.....	29,303,132	32,580,828	26,831,975	14,278,819	12,713,813	7,073,400	101.0	20.8	66.4			
Salaries.....	4,035,446	3,339,741	2,007,237	(*)	(*)	(*)	1.8	-13.6	17.8	89.7	2.9	79.7
Wages.....	25,267,686	29,241,087	24,824,738	16,521,246	19,736,358	9,379,980	-6.8	-16.7	11.9	102.6	-16.3	110.4
Materials.....	31,214,358	37,463,179	33,474,896	1,392,551	(*)	(*)	90.1	33.3	42.6	164.6		
Miscellaneous.....	7,004,477	5,255,506	3,684,811	1,392,551	(*)	(*)	-1.6	-11.4	11.1	95.8	3.4	71.3
Value of products.....	73,360,315	82,769,239	74,532,277	38,065,410	36,800,327	21,483,967	2.7	-7.0	10.3	90.6	26.3	41.0
Value added by manufacture (value of products less cost of materials).....	42,145,957	45,306,060	41,057,381	21,544,164	17,063,969	12,103,987						

¹ A minus sign (-) denotes decrease. Where percentages are omitted comparable figures are not available.

² Comparable figures not available.

³ Percentage omitted because figures are not strictly comparable.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

The number of establishments in the industry in 1909, 1,353, was greater than the number shown for any prior census, with the exception of that for 1879, when 2,188 were reported. While the number of establishments showed a decided increase from 1904 to 1909, most of the other important items showed decreases for this period. Between 1899 and 1909 the average number of wage earners decreased 13.4 per cent and the value of products 1.6 per cent, but there was an increase of 2.7 per cent in the value added to materials by manufacture. This decrease in number of wage earners and value of products is due largely to the dismantling of a large shipyard in Connecticut after the completion of the steamships *Minnesota* and *Dakota*, to a decrease in construction in certain establishments in Pennsylvania, and to a reduction in the output of one large establishment in California.

Government establishments.—Table 3 presents a comparative summary for the census years 1909 and 1904 of the general statistics of shipbuilding establishments operated by the Federal Government, so far as these statistics are comparable with corresponding figures for privately operated establishments.

Table 3

	GOVERNMENT SHIPYARDS.		
	Number or amount.		Per cent of increase: 1904-1909.
	1909	1904	
Number of establishments.....	12	9	33.3
Persons engaged in the industry.....	16,425	13,932	17.9
Salaried employees.....	1,888	1,728	9.3
Wage earners (average number).....	14,537	12,204	19.1
Primary horsepower.....	32,525	13,933	133.4
Amount paid for services.....	\$15,317,330	\$11,853,239	29.2
Salaries.....	2,646,806	2,130,475	24.2
Wages.....	12,670,524	9,722,764	30.3
Cost of materials.....	9,526,109	6,731,931	41.5
Value of products.....	25,872,033	17,265,469	49.8

¹ The figures do not agree with those contained in the report for 1904, as the statistics for that year were revised after the publication of that report.

The increases shown in the above table are accounted for by the growth of the Navy, which has resulted in an

Connecticut, and several other states the value of products was less in 1909 than in 1899.

Persons engaged in the industry.—Table 5 shows, for the industry as a whole and for each of its two main branches separately, the number of persons engaged in 1909, classified according to occupational status and sex, and, in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
SHIPBUILDING, INCLUDING BOAT BUILDING.			
All classes.....	44,949	44,597	352
Proprietors and officials.....	2,471	2,447	24
Proprietors and firm members.....	1,463	1,440	23
Salaried officers of corporations.....	367	366	1
Superintendents and managers.....	641	641	.....
Clerks.....	1,972	1,706	266
Wage earners (average number).....	40,506	40,444	62
16 years of age and over.....	40,135	40,073	62
Under 16 years of age.....	371	371	.....
SHIPBUILDING, IRON AND STEEL.			
All classes.....	30,041	29,890	151
Proprietors and officials.....	491	491	.....
Proprietors and firm members.....	21	21	.....
Salaried officers of corporations.....	122	122	.....
Superintendents and managers.....	348	348	.....
Clerks.....	1,407	1,302	105
Wage earners (average number).....	28,143	28,097	46
16 years of age and over.....	27,794	27,748	46
Under 16 years of age.....	349	349	.....
SHIPBUILDING, WOODEN, INCLUDING BOAT BUILDING.			
All classes.....	14,908	14,707	201
Proprietors and officials.....	1,980	1,956	24
Proprietors and firm members.....	1,442	1,419	23
Salaried officers of corporations.....	245	244	1
Superintendents and managers.....	293	293	.....
Clerks.....	565	404	161
Wage earners (average number).....	12,363	12,347	16
16 years of age and over.....	12,341	12,325	16
Under 16 years of age.....	22	22	.....

The average number of persons engaged in the industry as a whole during 1909 was 44,949, of whom 40,506, or 90.1 per cent, were wage earners; 2,471, or 5.5 per cent, proprietors and officials; and 1,972, or 4.4 per cent, clerks—a class which includes other subordinate salaried employees. Of the total number employed in the industry, 44,597, or 99.2 per cent, were males, and 352, or eight-tenths of 1 per cent, were females. Most of the females were clerks, only 62 being wage earners. The average number of boys under 16 years of age was 371, or eight-tenths of 1 per cent of the total.

In iron and steel shipbuilding 93.7 per cent of all persons engaged were wage earners, 1.6 per cent proprietors and officials, and 4.7 per cent clerks.

In wooden shipbuilding 82.9 per cent of all persons engaged were wage earners, the greater prevalence of individual ownership in this branch of the industry being shown by the fact that 9.7 per cent were proprietors and firm members.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 32. The distribution of the average number by sex and age is not shown for the individual states, but Table 33 gives such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 6.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY—ALL BRANCHES COMBINED.				
	1909		1904		Per cent of increase: ¹ 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	44,949	100.0	54,424	100.0	-17.4
Proprietors and firm members.....	1,463	3.3	1,190	2.2	22.9
Salaried employees.....	2,980	6.6	2,480	4.6	20.2
Wage earners (average number).....	40,506	90.1	50,754	93.3	-20.2

¹ A minus sign (—) denotes decrease.

Table 7 shows the average number of wage earners in the industry, distributed according to age, and, in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899. There was a marked reduction between 1899 and 1909 in the number of children employed.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY—ALL BRANCHES COMBINED.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	40,506	100.0	50,754	100.0	48,747	100.0
16 years of age and over.....	40,135	99.1	49,980	98.5	45,745	97.9
Male.....	40,073	98.9	49,915	98.3	45,711	97.8
Female.....	62	0.2	65	0.1	34	0.1
Under 16 years of age.....	371	0.9	774	1.5	1,002	2.1

Wage earners employed, by months.—Table 8 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 14 states in which an average of more than 500 wage earners were employed during the year.

The largest number of wage earners reported for any month of 1909 was 42,256 for April, and the smallest number 37,565 for February, the latter number forming 88.9 per cent of the former. Employment throughout the year in the different states was fairly uniform. In 1904 the maximum number, 53,975, was reported

for April, and the minimum, 47,476, or 88 per cent of the maximum, for January.

Table 8 shows further that the month of maximum employment varied considerably among the states. In Massachusetts January was the month of maximum employment; in Ohio, March; in Maine, Maryland, and New Jersey, April; in Michigan, New York, Rhode

Island, and Washington, May; in Virginia, September; in California and Pennsylvania, November; and in Delaware and Wisconsin, December.

The month of maximum and of minimum employment for 1909 and the number of wage earners reported for these months are given in Table 33 for each state for which separate statistics can be presented.

Table 8

STATE.	WAGE EARNERS EMPLOYED IN THE SHIPBUILDING INDUSTRY: 1909 ¹												
	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	40,506	38,516	37,565	39,922	42,256	42,244	41,690	40,190	39,149	40,283	41,151	41,023	42,075
California.....	1,844	1,596	1,607	1,549	1,713	<i>1,512</i>	1,580	1,668	1,844	1,958	2,188	2,553	2,357
Delaware.....	1,239	1,351	1,230	1,207	1,293	1,077	1,090	1,128	<i>996</i>	1,216	1,308	1,433	1,541
Maine.....	1,755	1,666	1,736	1,910	1,975	1,964	1,755	1,704	1,741	1,741	1,701	1,642	<i>1,530</i>
Maryland.....	1,793	<i>1,533</i>	1,662	1,843	1,925	1,849	1,887	1,882	1,657	1,924	1,804	1,637	1,920
Massachusetts.....	3,604	4,180	3,608	3,552	3,522	3,533	3,440	3,467	<i>3,415</i>	3,522	3,722	3,531	3,756
Michigan.....	2,344	1,660	2,016	2,588	3,190	3,492	2,871	2,687	2,454	2,237	1,836	<i>1,536</i>	1,560
New Jersey.....	4,869	4,901	<i>4,431</i>	4,764	5,223	5,138	4,600	4,736	4,872	5,047	5,085	4,832	4,802
New York.....	5,644	5,169	<i>4,868</i>	5,881	6,346	6,437	6,194	5,294	4,960	5,526	5,824	5,824	5,605
Ohio.....	3,200	4,168	<i>4,172</i>	4,231	4,049	3,638	3,257	2,487	2,176	<i>1,946</i>	2,445	2,514	3,318
Pennsylvania.....	3,558	3,249	<i>3,144</i>	3,201	3,156	3,214	3,635	3,722	3,502	3,657	4,011	4,148	4,057
Rhode Island.....	535	561	543	634	642	677	534	500	410	<i>407</i>	445	520	542
Virginia.....	5,382	4,140	4,021	3,931	4,133	4,669	5,753	6,064	6,343	6,568	6,554	6,370	6,040
Washington.....	744	<i>619</i>	668	806	925	952	797	753	682	649	642	711	716
Wisconsin.....	906	892	952	795	858	931	952	898	928	861	886	820	1,105

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

Prevailing hours of labor.—In Table 9 the wage earners in the shipbuilding industry in 1909 have been classified according to the number of hours of labor prevailing in the establishments in which they were employed. The average number of wage earners employed during the year in each establishment has been classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or less number of hours.

shown in the table, 54 hours per week was the most common time of employment reported, and in four others more than 54 but less than 60, while in four states 60 hours per week was the most common working time.

Character of ownership.—Table 10 presents statistics with respect to the character of ownership of establishments in the industry.

Table 9

STATE.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY— ALL BRANCHES COMBINED: 1909						
	Total.	In establishments with prevailing hours—					
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States....	40,506	3,885	2,674	9,883	10,045	14,038	1
California.....	1,844	228	1,144	400	72	72	.....
Delaware.....	1,239	.....	1,159	50	30	.....	.....
Maine.....	1,755	26	3	179	1,265	282	.....
Maryland.....	1,793	74	32	464	1,056	167	.....
Massachusetts.....	3,604	94	170	658	2,673	9	.....
Michigan.....	2,344	2	3	85	1,093	1,161	.....
New Jersey.....	4,869	150	191	1,278	340	2,910	.....
New York.....	5,644	2,271	882	2,000	160	331	.....
Ohio.....	3,200	3	16	131	375	2,675	.....
Pennsylvania.....	3,558	378	156	143	2,842	39	.....
Rhode Island.....	535	1	.....	512	22	.....	.....
Virginia.....	5,382	13	4	259	11	5,095	.....
Washington.....	744	272	2	452	.....	18	.....
Wisconsin.....	906	4	.....	501	33	368	.....

More than four-fifths (83.9 per cent) of the wage earners employed in the industry in 1909 worked in establishments where the prevailing number of hours was from 54 to 60, inclusive, per week. Of the seven groups shown in Table 9, the largest was that made up of wage earners in establishments where the prevailing hours were 60 per week. In four of the states

Table 10

CHARACTER OF OWNERSHIP.	SHIPBUILDING, INCLUDING BOAT BUILDING.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	1,353	1,097	\$73,380,315	\$82,789,239
Individual.....	824	673	6,796,334	8,932,284
Firm.....	282	224	4,917,433	5,945,180
Corporation.....	1,247	200	61,646,548	67,891,775
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	60.9	61.3	9.3	10.8
Firm.....	20.8	20.4	6.7	7.2
Corporation.....	18.3	18.2	84.0	82.0

¹ Includes 1 small establishment under "other" ownership, to avoid disclosure of individual operations.

The most important distinction shown is that between corporate and all other forms of ownership. Of the total number of plants reported for 1909, 247 (including one under "other" ownership), or 18.3 per cent, were under corporate ownership, as compared with 18.2 per cent in 1904. While corporations thus controlled less than one-fifth of the total number of establishments in 1909, the value of the products of these establishments represented 84 per cent of the total value of products for all establishments engaged in the industry. But little change took place from 1904 to 1909 in the relative importance of the several forms of ownership.

Table 11 shows, for 13 of the leading states, statistics for establishments under each of the three forms of ownership in 1909.

In 1909, of the total number of wage earners in the

industry, 3,660, or 9 per cent, were employed in establishments under individual ownership; 2,371, or 5.9 per cent, in those under firm ownership; and 34,475, or 85.1 per cent, in those owned by corporations.

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	824	282	247	3,660	2,371	34,475	\$6,796,334	\$4,917,433	\$61,646,548	\$4,011,175	\$2,941,958	\$35,192,824
California.....	19	10	14	80	78	1,686	242,994	223,530	3,665,652	134,348	141,749	2,619,030
Delaware.....	4	2	4	(X)	(X)	1,239	(X)	(X)	1,990,240	(X)	(X)	1,009,587
Maine.....	116	24	16	220	244	1,231	506,087	556,424	1,993,124	281,053	287,014	1,324,475
Maryland.....	28	9	9	212	142	1,439	331,736	222,158	2,980,681	137,583	123,099	1,374,764
Massachusetts.....	78	22	15	278	105	3,221	578,803	218,005	6,199,039	325,916	134,530	3,804,708
Michigan.....	59	19	13	422	166	1,756	446,136	360,539	4,227,161	261,150	210,042	2,072,872
New Jersey.....	60	16	21	294	210	4,365	457,006	363,116	8,020,393	288,561	216,478	4,086,200
New York.....	169	42	44	981	510	4,153	2,049,969	1,163,113	8,204,107	1,220,127	725,812	5,546,584
Ohio.....	20	8	11	177	58	2,965	238,880	114,253	5,323,283	125,050	59,051	3,030,473
Pennsylvania.....	15	7	9	62	76	3,420	136,267	206,748	5,835,130	80,028	107,921	3,280,642
Rhode Island.....	6	3	4	42	8	485	75,240	27,430	714,611	49,042	14,746	449,165
Washington.....	30	23	7	120	187	437	282,060	424,007	844,120	177,532	279,990	530,307
Wisconsin.....	27	11	14	50	76	780	107,163	121,136	1,671,323	67,975	69,049	944,060

NOTE.—In Delaware, in order to avoid disclosing the returns for the establishments under individual and firm ownership, the figures for these groups have been consolidated with those for establishments under corporate ownership and an (X) is placed in the columns from which the figures have been omitted. The figures for establishments under corporate ownership include those for one small establishment under an unclassified form of ownership.

There is considerable variation among the states as to the relative importance of the establishments operated by individuals, firms, and corporations. Thus in Pennsylvania establishments operated by corporations constituted 29 per cent of all establishments in the industry, reported 94.4 per cent of the total value of products, and gave employment to 96.1 per cent of all the wage earners; while in Washington such establishments constituted only 11.7 per cent of the total number of establishments, reported 54.5 per cent of the value of products, and gave employment to 58.7 per cent of the wage earners.

Size of establishments.—Table 12 shows, for the shipbuilding industry as a whole and for each of its branches and subbranches, the average number of wage earners per establishment in 1909, together with the average value of products and average value added by manufacture.

BRANCH OF INDUSTRY.	AVERAGE PER ESTABLISHMENT: 1909		
	Number of wage earners.	Value of products.	Value added by manufacture.
All branches.....	29.9	\$54,220	\$31,150
Iron and steel shipbuilding.....	531.0	936,175	526,431
New construction on vessels of 5 tons and over.....	637.9	1,124,278	608,922
Repair work only.....	260.1	459,649	317,456
Wooden shipbuilding and boat building.....	9.5	18,264	10,958
New construction on vessels of 5 tons and over.....	17.9	36,572	20,806
Repair work only.....	22.9	33,270	22,691
Making boats under 5 tons.....	3.3	7,116	4,354
Making masts, spars, and oars, and rigging vessels.....	4.4	11,073	6,255

This table brings out the great differences among the several branches and subbranches with respect to average size of establishments. For all branches combined the average value of products per establishment decreased from \$75,451 in 1904 to \$54,220 in 1909, and the average value added by manufacture from \$41,300 to \$31,150. The average number of wage earners per establishment likewise shows a decrease from 46 in 1904 to 30 in 1909. The decrease in the average number of wage earners and in the average value of products per establishment is due to two things—a decline in that branch of the shipbuilding industry represented chiefly by the large establishments building vessels of over 5 tons, and an increase in that branch of the industry represented by the small establishments building boats of less than 5 tons. There was an absolute decrease in the number of establishments and value of products for the former class and an increase in the number and value of products of the establishments of the latter class.

Table 13 classifies the establishments in the shipbuilding industry as a whole according to the value of their products for each group for 1909 and 1904. It is evident from the statistics presented in Table 12 that such a classification of establishments, if made for each of the two main branches of the industry, would show great differences between them, the proportion of large establishments being much greater in iron and steel shipbuilding than in wooden shipbuilding. The number of establishments engaged in iron and steel shipbuilding is, however, so small (only 53) that it was not considered worth while to classify them separately.

VALUE OF PRODUCTS PER ESTABLISHMENT.	SHIPBUILDING, INCLUDING BOAT BUILDING.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	1,353	1,097	\$73,360,315	\$82,789,239
Less than \$5,000.....	682	486	1,534,941	1,065,751
\$5,000 and less than \$20,000.....	361	296	3,688,013	2,986,779
\$20,000 and less than \$100,000.....	218	209	9,388,497	9,144,370
\$100,000 and less than \$1,000,000.....	78	90	21,143,086	21,484,372
\$1,000,000 and over.....	14	16	37,605,778	48,087,967
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	50.4	44.3	2.1	1.3
\$5,000 and less than \$20,000.....	26.7	27.0	5.0	3.6
\$20,000 and less than \$100,000.....	16.1	19.1	12.8	11.0
\$100,000 and less than \$1,000,000.....	5.8	8.2	28.8	26.0
\$1,000,000 and over.....	1.0	1.5	51.3	58.1

Of the 1,353 establishments reported for 1909, 14, or 1 per cent, reported products valued at \$1,000,000

or over. In 1904 there were 16 establishments of this class out of a total of 1,097. While such establishments represented a comparatively small proportion of the total number at both censuses, they reported 51.3 per cent of the value of products in 1909 and 58.1 per cent in 1904.

The increase between 1904 and 1909 in the number of establishments with products valued at less than \$5,000 is doubtless attributable largely to the increase in the number of small concerns engaged in building motor boats and other small craft.

Table 14 presents a classification of the establishments in the shipbuilding industry according to the number of wage earners employed, for the United States and for each state in which an average of more than 500 wage earners were employed in 1909.

STATE.	SHIPBUILDING, INCLUDING BOAT BUILDING: 1909																			
	Total.		Establishments employing—																	
			No wage earners.		1 to 5 wage earners.			6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
Es-tab-lish-ments.	Wage earners (average number)	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.....	1,353	40,506	192	711	1,456	257	2,841	94	3,089	52	3,632	23	3,978	10	3,355	6	4,311	8	17,844	
California.....	43	1,844	3	19	46	11	124	5	133	1	73	3	502	.....	.....	1	966	.....	.....
Delaware.....	10	1,239	.....	3	12	3	24	2	53	.....	.....	.....	1	484	1	666	.....	.....	.....
Maine.....	156	1,755	33	93	125	21	237	6	227	2	117	.....	.....	.....	.....	.....	.....	1	1,049
Maryland.....	46	1,793	3	22	43	7	68	10	321	2	132	1	228	.....	.....	.....	.....	1	1,001
Massachusetts.....	115	3,604	10	80	184	15	171	5	148	2	120	2	329	.....	.....	.....	.....	1	2,652
Michigan.....	91	2,344	23	45	95	11	118	2	65	4	312	4	774	1	314	1	666	.....	.....
New Jersey.....	97	4,869	8	57	116	13	124	6	206	8	588	3	523	1	453	.....	.....	1	2,859
New York.....	255	5,644	37	121	264	61	724	17	600	13	934	2	348	2	584	1	548	1	1,642	
Ohio.....	39	3,200	8	13	27	8	90	4	154	2	108	.....	.....	1	282	2	1,465	1	1,074
Pennsylvania.....	31	3,558	2	12	26	7	70	2	61	3	199	3	366	.....	.....	.....	.....	1	2,502
Rhode Island.....	13	535	.....	7	18	3	47	1	36	1	91	.....	.....	1	343	.....	.....	.....	.....
Virginia.....	36	5,382	2	25	68	4	31	1	21	3	197	.....	.....	.....	.....	.....	.....	1	5,065
Washington.....	60	744	8	28	57	18	201	4	124	1	75	.....	.....	1	287	.....	.....	.....	.....
Wisconsin.....	52	906	5	33	59	8	85	3	82	.....	.....	2	406	1	274	.....	.....	.....	.....

Of the 1,353 establishments reported in 1909, 14.2 per cent employed no wage earners, 52.5 per cent employed from 1 to 5, and 19 per cent from 6 to 20. There were 99 establishments that employed an average of more than 50 wage earners, and of these, 47 employed over 100 and 14 over 500. These 14 large establishments were distributed among 11 states.

Of the total number of wage earners reported, 10.6 per cent were reported by establishments employing from 1 to 20; 7.6 per cent by establishments employing from 21 to 50; 9 per cent by establishments employing from 51 to 100; 18.1 per cent by establishments employing from 101 to 500; and 54.7 per cent in establishments employing over 500.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were

reported. Table 1 shows the total expenses in the shipbuilding industry in 1909 to have been \$67,521,967, distributed as follows: Cost of materials, \$31,214,358, or 46.2 per cent; wages, \$25,267,686, or 37.4 per cent; salaries \$4,035,446, or 6 per cent; and miscellaneous expenses, \$7,004,477, or 10.4 per cent. Of the total miscellaneous expenses, \$404,206 was for rent of yards or shops, \$431,450 for taxes, \$1,185,579 for contract work, and \$4,983,242 for all other objects, including rent of offices, insurance, ordinary repairs of buildings and machinery, etc.

Table 15 shows, in percentages, the distribution of the total expenses reported in 1909 for each branch of the shipbuilding industry among the four classes just named. There is comparatively little difference between iron and steel shipbuilding and wooden ship and boat building with respect to the relative importance of the several classes of expenses. Cost of materials formed a considerably larger proportion of the total expenses in the case of establishments doing new

work than in the case of those doing repair work only, while in the case of establishments making masts, spars, etc., the proportion for cost of materials was higher than in any other branch.

BRANCH OF INDUSTRY.	PER CENT OF TOTAL EXPENSES IN 1909 CONSISTING OF—			
	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.
All branches.....	6.0	37.4	46.2	10.4
Iron and steel shipbuilding.....	6.2	36.7	46.3	10.8
New construction on vessels of 5 tons and over.....	6.5	35.9	47.6	10.0
Repair work only.....	4.1	42.5	36.9	16.5
Wooden shipbuilding and boat building.....	5.4	39.1	46.1	9.3
New construction on vessels of 5 tons and over.....	4.7	38.8	48.4	8.1
Repair work only.....	7.5	46.0	37.1	9.4
Making boats under 5 tons.....	5.9	34.5	47.1	12.6
Making masts, spars, and oars, and rigging vessels.....	3.2	30.8	55.7	10.3

Table 16 shows in percentages, for all states for which separate figures can be given, for 1909, the distribution of the total expenses reported for the shipbuilding industry as a whole among the several classes.

STATE.	PER CENT OF TOTAL EXPENSES REPORTED FOR SHIPBUILDING, INCLUDING BOAT BUILDING: 1909			
	Salaries.	Wages.	Materials.	Miscellaneous expenses.
United States.....	6.0	37.4	46.2	10.4
Alabama.....	9.0	46.4	31.5	13.1
California.....	5.5	40.3	31.3	22.9
Connecticut.....	5.1	37.9	47.1	9.9
Delaware.....	9.3	35.7	50.2	4.8
Florida.....	5.8	47.6	38.3	8.3
Idaho.....	.....	25.6	67.1	7.4
Illinois.....	6.4	47.3	37.3	9.0
Indiana.....	5.2	27.4	62.7	4.7
Iowa.....	5.0	30.8	53.9	10.3
Kentucky.....	2.6	36.5	58.1	2.8
Louisiana.....	8.5	50.3	32.9	8.4
Maine.....	4.4	39.3	46.3	10.0
Maryland.....	4.9	33.3	56.1	5.7
Massachusetts.....	8.8	34.4	41.1	15.8
Michigan.....	6.5	29.2	52.7	11.6
Minnesota.....	2.4	43.1	48.8	5.7
Mississippi.....	2.2	41.1	52.7	4.0
New Hampshire.....	.....	41.3	41.8	16.8
New Jersey.....	7.0	38.3	49.4	5.3
New York.....	5.6	38.8	40.3	15.3
North Carolina.....	0.8	31.5	59.4	8.4
Ohio.....	5.4	35.5	51.3	7.8
Oregon.....	2.5	45.3	48.6	3.6
Pennsylvania.....	6.9	35.3	45.2	12.6
Rhode Island.....	7.7	48.9	40.3	3.1
Tennessee.....	.....	46.5	46.0	7.4
Texas.....	0.8	44.8	52.2	2.1
Vermont.....	4.3	42.5	47.8	5.3
Washington.....	7.1	44.8	39.2	9.0
West Virginia.....	4.6	44.4	46.6	4.3
Wisconsin.....	4.5	35.0	53.1	7.4

In 12 of the states shown in Table 16 the cost of materials represented over 50 per cent of the total expenses reported, and in Idaho and Indiana over 60 per cent, while in Alabama, California, and Louisiana they represented but little over 30 per cent. The proportion represented by wages was more uniform; in only 1 state (Louisiana) was the proportion above 50 per cent, and in only 3—Idaho, Indiana, and Michigan—was it below 30 per cent.

Engines and power.—The amount of power used in the shipbuilding industry was first reported at the census of 1869. Table 2 shows that the total horsepower used in the industry increased from 5,136 in 1869 to 88,063 in 1909. Table 17 shows the number

of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current) and their total horsepower as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments.

POWER.	SHIPBUILDING, INCLUDING BOAT BUILDING.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	1,960	1,359	862	88,063	78,127	61,797	100.0	100.0	100.0
Owned.....	1,416	1,206	862	78,769	75,529	60,519	89.4	96.7	97.9
Steam.....	991	1,015	804	73,149	69,253	55,899	83.1	88.6	90.5
Gas.....	420	182	48	3,503	1,785	645	4.0	2.3	1.0
Water wheels.....	3	4	10	63	67	1,700	0.1	0.1	2.8
Water motors.....	2	5	(¹)	23	20	(¹)	(²)	(²)	.....
Other.....	.....	.....	.....	2,031	4,404	2,275	2.3	5.6	3.7
Rented.....	544	153	(¹)	9,294	2,598	1,278	10.6	3.3	2.1
Electric.....	544	153	(¹)	9,264	2,367	975	10.5	3.0	1.6
Other.....	.....	.....	.....	30	231	303	(²)	0.3	0.5
Electric motors.....	2,266	1,290	428	35,334	17,630	7,177	100.0	100.0	100.0
Run by current generated by establishment.....	1,722	1,137	428	26,070	15,263	6,202	73.8	86.6	86.4
Run by rented power.....	544	153	(¹)	9,264	2,367	975	26.2	13.4	13.6

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power used in the shipbuilding industry increased from 61,797 horsepower in 1899 to 88,063 in 1909. Most of this increase was in the power of steam engines and electric motors run by purchased current. At each census steam was the principal source of power employed in the industry, but its relative importance has decreased since 1899. In that year steam power formed 90.5 per cent of the total primary power, as against only 83.1 per cent in 1909. There has been a marked increase, both absolutely and relatively, in the horsepower of gas and other internal combustion engines and of electric motors run by rented power. The horsepower of electric motors run by current generated in the establishment increased from 6,202 in 1899 to 26,070 in 1909.

Table 18 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in each of 14 selected states.

The states which in 1909 ranked highest with respect to the amount of power used in the shipbuilding industry were New York, New Jersey, Ohio, Pennsylvania, Virginia, Maryland, and Michigan in the order named. The total horsepower reported for these seven states in 1909 was 60,448, or 68.6 per cent of the total for the United States. Steam was by far the most important power in all of the states shown except Maine, which reported a larger amount of rented electric power than of any other kind. The largest amount of steam power is shown for New Jersey, and the largest amount of gas-engine power, as well as of rented electric power, for New York.

Table 18

SHIPBUILDING, INCLUDING BOAT BUILDING: 1909

STATE.	Number of establishments reporting.	Total horsepower.	Primary horsepower						Electric horsepower.		Fuel used.						
			Owned by establishments reporting.				Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).	
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec- tric.			Other.	Anthra- cite (long tons).					Bitumi- nous (short tons).
United States.....	914	88,063	78,769	73,149	3,503	36	2,031	3,264	30	35,334	28,070	12,080	301,501	10,726	12,652	88,916	274,071
California.....	39	3,129	2,995	2,900	95	.....	.....	134	.....	1,098	964	6	1,113	67	150	60,511	15
Delaware.....	8	3,582	2,808	2,798	10	.....	.....	774	.....	3,225	2,452	49	9,912	984	.....	1,782	178
Maine.....	86	2,447	1,201	901	285	.....	15	1,246	.....	1,246	.....	317	5,103	104	270	296	203
Maryland.....	27	6,795	6,686	6,032	157	.....	.....	109	.....	1,284	1,175	323	24,776	466	671	5,557	.....
Massachusetts.....	81	3,783	3,471	3,174	297	.....	.....	282	30	1,285	1,003	870	33,042	164	222	567	263
Michigan.....	58	6,485	6,165	5,976	174	15	.....	320	.....	1,898	1,578	13	28,933	636	279	2,346	14
New Jersey.....	66	9,904	9,590	9,149	441	.....	.....	314	.....	5,225	4,911	3,526	33,460	1,543	83	380	506
New York.....	164	13,835	9,754	8,921	778	55	.....	4,081	.....	4,471	390	6,247	30,881	100	272	1,626	3,782
Ohio.....	29	8,125	7,940	7,867	73	.....	.....	185	.....	3,272	3,087	172	28,688	1,513	5	3,607	286,428
Pennsylvania.....	20	7,771	7,621	6,086	35	.....	1,500	150	.....	4,210	4,060	50	44,633	976	325	222	924
Rhode Island.....	10	1,030	996	966	30	.....	.....	34	.....	34	.....	6	4,109	.....	.....	16	.....
Virginia.....	29	7,533	7,170	7,067	103	.....	.....	363	.....	5,613	5,250	8	35,745	3,200	9	5,087	1,506
Washington.....	45	2,105	1,769	1,639	111	.....	19	336	.....	616	280	.....	1,696	529	8,682	5,196	.....
Wisconsin.....	41	3,506	3,393	3,281	112	.....	.....	113	.....	668	555	206	9,477	265	53	555	.....
All other states.....	211	8,033	7,210	6,392	802	16	.....	823	.....	1,188	365	287	12,033	178	1,631	2,188	252

Fuel consumed.—Closely related to the question of kind of power employed is that of fuel consumed in generating this power or otherwise used in the industry. The amount reported as expended for fuel and rent of power in 1909 was \$1,191,654 (see Table 33). As shown by Table 18, bituminous coal is the principal class of fuel used by shipyards, 301,501 tons being con-

sumed in 1909. California reported 60,511 barrels of oil, or 67.3 per cent of the total quantity of that kind of fuel consumed in the industry, while Ohio reported 97.2 per cent of all the gas reported. The largest amount of anthracite coal, 6,247 long tons, or more than one-half the total for the industry, was reported by New York.

SPECIAL DATA AS TO VESSELS LAUNCHED, VALUE OF WORK DONE, AND EQUIPMENT.

THE UNITED STATES AS A WHOLE.

Number of vessels launched.—The special schedule used in collecting the statistics for shipbuilding required a detailed statement of the number, kind, and tonnage of vessels launched during the year, and a statement of the value of the different kinds of work done during the year, together with special information regarding the equipment of the shipyards.

Table 19 shows the number and gross tonnage of all vessels launched during the census years 1909, 1904, and 1899, distinguishing three classes of establishments reporting. In many cases, a large part of the work on vessels launched during the census year was performed during prior years and, conversely, much work was done during each census year on vessels not yet ready for launching at the end of the year.

The decline in shipbuilding during the five-year period between 1904 and 1909 is clearly brought out by the fact that for all classes of vessels of 5 tons and over there was a decrease, with the exception of motor boats, which formed a very small part of the total number reported. The decline in the iron and steel branch of the industry is no doubt due to the decrease in Government work done in private shipyards. The increase in the number of small boats constructed is perhaps the most noteworthy fact brought out by the table. Motor boats of more than 5

tons increased 189.9 per cent in gross tonnage from 1904 to 1909. The number of small power boats of less than 5 tons launched by private establishments in the shipbuilding industry was 8,577 in 1909, as against 1,687 in 1899, an increase for the decade of 408.4 per cent. Practically all the boats of this tonnage are fitted with internal-combustion engines.

The statistics show strikingly the continued decline in the building of sailing vessels for the water transportation of the United States. The number of sail vessels launched decreased from 648 in 1899 to 119 in 1909, and the gross tonnage from 80,294 to 17,459, or 78.3 per cent.

In explanation of a number of the tables wherein tonnage is shown, it should be stated that the gross tonnage of a ship is the total internal capacity, expressed in "tons" of 100 cubic feet, while the net tonnage is the portion available for cargo and passengers—in other words, the earning capacity of the ship—expressed on a similar basis. By methods defined by law, now practically uniform for the leading maritime nations, measurements are made to ascertain the capacity of the vessel in cubic feet and the result is divided by 100, the quotient being the gross tonnage of the vessel. Net tonnage is ascertained in the case of sailing vessels by deducting from the gross tonnage the space set apart for the quarters of the

master and crew and for minor purposes of navigation, and in the case of steam vessels, by deducting from the gross tonnage the space required for the quarters of the officers and crew, and for the boilers, machinery, and coal bunkers. Differing from either of these is the displacement tonnage of a vessel, which is merely the weight of the volume of water displaced, or the weight of the vessel and its load. The tonnage of war vessels of the United States Navy as given is always displacement tonnage and is the weight of the vessels in ordinary cruising condition. While gross tonnage and displacement tonnage are not by any means the same, it was necessary to combine the tonnage of vessels whose capacity is reckoned in one way with that of vessels whose capacity is reckoned by the other method in order to obtain a total which should represent approximately the total tonnage launched during the year.

Table 20 gives, by states, the total number and gross tonnage of all vessels of 5 tons and over launched in 1909 by private establishments in the shipbuilding industry.

Table 19

CLASS.	VESSELS LAUNCHED DURING THE YEAR BY—						
	All establishments.		Private establishments in shipbuilding industry.		Private establishments in other industries.		Government shipyards.
	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.	Number. Displacement.
Vessels of 6 gross tons and over, total:							
1909.....	1,637	481,813	1,584	467,219	22	12,535	31 2,059
1904.....	2,279	728,104	2,114	678,525	134	22,327	31 27,252
1899.....	2,081	687,159	2,081	687,159			
Classified by material—							
Iron and steel—							
1909.....	169	260,765	158	254,986	8	5,429	3 350
1904.....	172	352,669	152	328,411	3	408	17 23,850
1899.....	134	262,516	134	262,516			
Wooden—							
1909.....	1,468	221,048	1,426	212,233	14	7,106	28 1,709
1904.....	2,107	375,435	1,962	350,114	131	21,919	14 3,402
1899.....	1,947	424,643	1,947	424,643			
Classified by power—							
Steam—							
1909.....	194	235,315	181	234,633	3	429	10 253
1904.....	320	368,117	308	349,600	6	467	6 18,050
1899.....	519	286,311	519	286,311			
Motor—							
1909.....	447	9,413	445	9,389	2	24	
1904.....	311	3,247	307	3,157	4	90	
1899.....							
Sail—							
1909.....	119	17,459	119	17,459			
1904.....	352	68,615	349	64,615			3 4,000
1899.....	648	80,294	648	80,294			
Unrigged—							
1909.....	877	219,626	839	205,738	17	12,082	21 1,806
1904.....	1,296	288,125	1,150	261,153	124	21,770	22 5,202
1899.....	914	320,554	914	320,554			
Boats of less than 5 gross tons:							
1909.....	9,042		8,577		412		53.....
1904.....	3,916		3,499		365		52.....
1899.....	2,364		1,687				677.....

In the tables which follow, gross tonnage is shown for 1909 unless otherwise specified. It is impossible to indicate for censuses previous to 1904 the proportion of displacement tonnage included in the figures, but owing to the fact that the building of Government warships has only recently become prominent in the industry, it is probable that for censuses prior to 1899 displacement tonnage formed a comparatively small proportion of the totals shown in the tables.

Table 20

STATE.	VESSELS OF 5 TONS AND OVER LAUNCHED IN 1909 (EXCLUSIVE OF THOSE LAUNCHED IN GOVERNMENT SHIPYARDS).	
	Number.	Tonnage (gross).
United States.....	11,584	1,487,219
California.....	59	8,563
Connecticut.....	45	5,447
Delaware.....	16	10,871
Florida.....	35	3,215
Illinois.....	9	991
Kentucky.....	90	41,240
Louisiana.....	69	7,012
Maine.....	44	12,654
Maryland.....	52	34,160
Massachusetts.....	82	17,703
Michigan.....	53	41,847
Minnesota.....	6	231
Mississippi.....	31	8,086
New Jersey.....	90	53,261
New York.....	309	60,152
North Carolina.....	17	858
Ohio.....	88	81,803
Oregon.....	34	4,718
Pennsylvania.....	205	12,775
Texas.....	19	1,680
Virginia.....	38	44,388
Washington.....	137	5,256
Wisconsin.....	29	6,453
All other states.....	27	3,855

¹ In addition, 22 vessels, with a gross tonnage of 12,535, were launched by establishments in other industries.

Of the total number of vessels of over 5 tons launched in 1909, New York built 19.5 per cent and Pennsylvania 12.9 per cent. Washington ranked third in number of vessels launched. Ohio, however, led all other states in aggregate tonnage, with New York, New Jersey, and Virginia following in the order named.

Table 21 shows, by states, for 1909, the number and the gross and net tonnage of steam vessels of 5 tons and over launched in private shipyards.

Table 21

STATE.	STEAM VESSELS OF 5 TONS AND OVER LAUNCHED IN PRIVATE SHIPYARDS IN 1909.		
	Number.	Tonnage.	
		Gross.	Net.
United States.....	181	234,633	168,959
California.....	9	4,993	3,264
Maine.....	8	3,888	2,983
Maryland.....	7	17,733	10,007
Massachusetts.....	20	12,381	8,232
Michigan.....	15	41,231	31,073
New Jersey.....	10	27,395	26,322
New York.....	30	7,528	5,185
Ohio.....	16	57,764	44,171
Oregon.....	8	1,522	1,154
Pennsylvania.....	9	2,841	2,680
Washington.....	5	800	574
Wisconsin.....	7	4,694	3,121
All other states.....	37	51,863	30,198

Of the states for which totals are presented, Ohio, Michigan, and New Jersey led in the order named, and combined reported 126,390 gross tons, or 53.9 per cent of the total for steam vessels of 5 tons and over launched in private yards in 1909. The steam vessels launched in these three states also showed

the largest average tonnage per vessel. Ohio, the leading state in total tonnage, also led in respect to average gross tonnage per vessel with an average for the 16 steamships launched in 1909 of 3,610 tons per vessel. "All other states" include several which had a gross tonnage greater than that shown for some of the states for which totals could be shown without the disclosure of individual operations, and of these Virginia was the most important.

The number and the gross and net tonnage of motor vessels of 5 tons and over, launched in private shipyards in 1904 and 1909, are shown, by states, in the following table:

STATE.	MOTOR VESSELS OF 5 TONS AND OVER LAUNCHED IN PRIVATE SHIPYARDS.			
	Cen-sus.	Num-ber.	Tonnage.	
			Gross.	Net.
United States.....	1909 1445 1904 2307		9,389 3,157	7,224 2,333
California.....	1909 19 1904 76		337 464	264 362
Connecticut.....	1909 26 1904 (3)		547 (3)	487 (3)
Florida.....	1909 19 1904		270	188
Louisiana.....	1909 6 1904 (3)		51 (3)	36 (3)
Maine.....	1909 15 1904 (3)		221 (3)	164 (3)
Massachusetts.....	1909 40 1904 13		2,664 110	2,227 90
Michigan.....	1909 33 1904 (3)		398 (3)	321 (3)
Minnesota.....	1909 (3) 1904 13		(3) 485	(3) 263
Mississippi.....	1909 (3) 1904 5		(3) 72	(3) 49
New Jersey.....	1909 23 1904 6		348 41	261 34
New York.....	1909 78 1904 64		1,290 706	951 532
Ohio.....	1909 16 1904 (3)		432 (3)	336 (3)
Oregon.....	1909 20 1904		358	272
Virginia.....	1909 6 1904 24		118 180	70 140
Washington.....	1909 83 1904 (3)		1,382 (3)	973 (3)
Wisconsin.....	1909 19 1904 49		259 347	204 313
All other states.....	1909 42 1904 57		714 752	470 550

¹ Exclusive of 2 vessels with an aggregate gross tonnage of 24 and an aggregate net tonnage of 18, launched by establishments in other industries.

² Exclusive of 4 vessels with an aggregate gross tonnage of 90 and aggregate net tonnage of 50, launched by establishments in other industries.

³ Included in "all other states."

Vessels fitted with internal-combustion engines, which now form such a large and distinct class, were reported separately for the first time in 1904. At that census the number of such vessels reported was 307, their average gross capacity being slightly over 10 tons. In 1909 their average capacity was over 21 tons gross. Washington reported the largest number of boats of this class launched in 1909, with New York

second and Massachusetts third, but Massachusetts led in tonnage.

Table 23 gives, by states, the number and the gross and net tonnage of sailing vessels of 5 tons and over launched in private shipyards in 1909, 1904, and 1899.

STATE.	SAIL VESSELS OF 5 TONS AND OVER LAUNCHED IN PRIVATE SHIPYARDS.			
	Cen-sus.	Num-ber.	Tonnage.	
			Gross.	Net.
United States.....	1909 119 1904 349 1899 648		17,459 64,615 80,294	14,680 55,074 70,120
California.....	1909 (1) 1904 16 1899 22		(1) 1,116 8,256	(1) 1,021 7,530
Connecticut.....	1909 6 1904 9 1899 14		41 3,106 188	29 2,589 180
Florida.....	1909 8 1904 (1) 1899 (1)		136 (1) (1)	83 (1) (1)
Maine.....	1909 21 1904 77 1899 76		8,545 38,692 32,651	6,985 32,461 28,100
Maryland.....	1909 9 1904 4 1899 20		1,698 384 374	1,634 268 220
Massachusetts.....	1909 20 1904 49 1899 128		1,950 4,280 3,889	1,477 2,994 2,910
Mississippi.....	1909 (1) 1904 14 1899 14		(1) 280 193	(1) 197 140
New Jersey.....	1909 12 1904 26 1899 80		251 880 357	175 761 240
New York.....	1909 15 1904 34 1899 85		678 5,146 1,400	551 4,924 1,150
North Carolina.....	1909 (1) 1904 4 1899 9		(1) 70 142	(1) 55 109
Washington.....	1909 5 1904 (1) 1899 (1)		144 (1) (1)	102 (1) (1)
All other states.....	1909 23 1904 116 1899 200		4,016 10,661 32,844	3,654 8,804 29,541

¹ Included in "all other states."

During each intercensal period covered by this table a great decrease took place in the number and tonnage of sailing vessels launched. The aggregate gross tonnage decreased from 80,294 in 1899 to 17,459 in 1909, or 78.3 per cent. With the exception of Florida and Washington, which were reported separately in 1909 for the first time, and Maryland, every state showed a decrease during the decade in number and tonnage of this type of vessel launched.

The state of Maine, which reported 59.9 per cent of the total tonnage in 1904, was still in 1909 the leading state, with 48.9 per cent of the total tonnage of this type of vessel launched. The gross tonnage for Maine in 1909 was more than four times that shown for the second state, Massachusetts.

Table 24 is a comparative statement of the number and tonnage of iron and steel and of wooden sail vessels of 5 tons and over launched by private shipyards in 1909, 1904, 1899, and 1889.

Table 24

YEAR.	SAIL VESSELS OF 5 TONS AND OVER LAUNCHED BY PRIVATE SHIPYARDS.					
	Total.		Iron and steel.		Wooden.	
	Num-ber.	Gross tonnage.	Num-ber.	Gross tonnage.	Num-ber.	Gross tonnage.
1909.....	119	17,459	3	2,046	116	15,413
1904.....	349	64,615	8	4,779	341	59,836
1899.....	648	80,294	6	21,085	642	59,209
1889.....	314	103,710	8	4,224	306	99,486

Both classes of vessels show large decreases in tonnage from 1904 to 1909, the decrease shown by wooden vessels being the greater, so that iron and steel vessels, which represented 7.4 per cent of the total tonnage in 1904, represented 11.7 per cent in 1909.

Table 25 gives, by states, the number and the gross and net tonnage of unrigged vessels launched by private shipyards in 1909, 1904, and 1899.

Table 25

STATE.	UNRIGGED VESSELS OF 5 TONS AND OVER LAUNCHED BY PRIVATE SHIPYARDS.			
	Census.	Num-ber.	Tonnage.	
			Gross.	Net.
United States.....	1909 1 838 1904 *1,150 1899 914		205,738 261,153 320,554	180,325 250,671 276,046
California.....	1909 29 1904 48 1899 35		3,016 5,777 6,726	2,971 5,562 5,890
Florida.....	1909 (2) 1904 43 1899 26	(2)	(2) 2,055 1,888	(2) 2,063 1,708
Illinois.....	1909 (2) 1904 9 1899 3	(2)	(2) 2,251 160	(2) 2,211 127
Kentucky.....	1909 (2) 1904 17 1899 2	(2)	(2) 4,898 560	(2) 4,898 500
Louisiana.....	1909 58 1904 73 1899 20		6,830 11,480 3,210	6,816 10,055 2,686
Maryland.....	1909 33 1904 49 1899 33		14,684 20,133 12,507	9,864 19,104 11,391
Mississippi.....	1909 20 1904 13 1899 8		5,081 1,955 1,150	5,016 1,570 946
New Jersey.....	1909 45 1904 35 1899 65		25,267 19,605 52,302	24,488 19,481 47,583
New York.....	1909 186 1904 211 1899 207		50,656 84,311 72,511	44,903 80,694 56,695
Ohio.....	1909 55 1904 41 1899 38		23,094 3,434 9,790	20,304 3,245 8,760
Pennsylvania.....	1909 195 1904 472 1899 177		9,929 66,002 66,180	9,763 65,650 65,688
Virginia.....	1909 23 1904 12 1899 4		3,631 2,280 400	3,478 2,215 360
Washington.....	1909 44 1904 34 1899 116		2,930 4,437 2,478	2,930 3,816 2,183
All other states.....	1909 151 1904 93 1899 180		60,720 32,525 90,192	59,792 30,007 70,629

¹ Exclusive of 17 vessels, with an aggregate gross tonnage of 12,082, launched by establishments in other industries.

² Exclusive of 124 vessels, with an aggregate gross tonnage of 21,770, launched by establishments in other industries.

³ Included in "all other states."

Both the number and the tonnage of unrigged vessels built show a decrease for the five-year period 1904-1909 and for the decade 1899-1909. New York was the leading state in the construction of this class of vessels in 1909 as in 1904. Only four states—Mississippi, New Jersey, Ohio, and Virginia—reported an increase in number and tonnage from 1904 to 1909, while Maryland shows an increase in number only.

Table 26 shows, by states, for 1909, 1904, and 1899, the number of power boats built of less than 5 tons gross, and for 1904 and 1899 the number of rowboats, canoes, and small sailboats.

Table 26

STATE.	BOATS OF LESS THAN 5 TONS LAUNCHED BY PRIVATE SHIPYARDS.		
	Census.	Small power boats.	Row-boats, canoes, and small sailboats.
United States.....	1909 18,677 1904 *3,499 1899 1,687		(2) 22,774 13,739
California.....	1909 138 1904 72 1899 14		(2) 600 583
Connecticut.....	1909 209 1904 156 1899 159		(2) 231 159
Florida.....	1909 215 1904 45 1899 1		(2) 73 96
Illinois.....	1909 305 1904 101 1899 5		(2) 191 356
Iowa.....	1909 76 1904 139 1899 2		(2) 109 38
Maine.....	1909 529 1904 289 1899 8		(2) 3,976 1,892
Maryland.....	1909 77 1904 39 1899 15		(2) 144 237
Massachusetts.....	1909 668 1904 342 1899 41		(2) 3,817 3,760
Michigan.....	1909 2,583 1904 646 1899 327		(2) 4,447 669
Minnesota.....	1909 304 1904 308 1899 37		(2) 1,604 488
New Jersey.....	1909 338 1904 237 1899 82		(2) 499 219
New York.....	1909 790 1904 453 1899 552		(2) 2,302 2,093
Ohio.....	1909 1,194 1904 214 1899 78		(2) 382 292
Pennsylvania.....	1909 45 1904 39 1899 15		(2) 544 380
Rhode Island.....	1909 27 1904 12 1899 2		(2) 187 131
Virginia.....	1909 59 1904 77 1899 1		(2) 191 76
Washington.....	1909 161 1904 30 1899 10		(2) 658 384
Wisconsin.....	1909 522 1904 123 1899 241		(2) 1,163 639
All other states.....	1909 337 1904 177 1899 97		(2) 1,657 1,247

¹ Exclusive of 412 boats launched by establishments in other industries.

² Not reported.

³ Exclusive of 365 boats launched by establishments in other industries.

Michigan was by far the leading state in 1909 in the manufacture of small power boats. The number of such boats built in that state increased from 327 in 1899 to 2,583 in 1909, or nearly 700 per cent. Ohio was second in the number of power boats. All but three of the states named in the table—Iowa, Minnesota, and Virginia—showed increases from 1904 to 1909 in the number of small power boats constructed.

Value of work done during census year.—The construction of a vessel of the larger type frequently requires more than one year to complete. In a number of instances work on vessels that were finished during the census year had been started in previous years, and in some cases vessels upon which work was started during the census year were not finished during that year. For this reason the office did not require the shipbuilders to report the value of the vessels launched, but only the value of the work done during the census year and the amount received for repair work.

For the smaller vessels—motor boats and those having a capacity of less than 5 tons—the value of work done during the year corresponds very closely with the value of the craft launched. Thus the value of the work done on boats of less than 5 gross tons in 1909, which is shown in Table 27 as amounting to \$4,891,408, corresponds very closely with the value of the craft of this type.

Table 27 shows the value of the construction work done, the amount received for repair work, and the value of all other work done by establishments assigned to the shipbuilding industry, for those that built vessels in connection with some other industry, and for the Government shipyards.

KIND OF WORK.	Cen- sus.	VALUE OF WORK DONE DURING YEAR BY—			
		All establish- ments.	Private estab- lish- ments in ship- building indus- try.	Private estab- lish- ments in other indus- tries.	Govern- ment shipyards.
Total		\$100,009,054	\$73,360,315	\$776,706	\$25,572,033
		100,892,050	82,769,239	657,342	17,265,469
Work on new vessels and boats:					
All kinds					
	1909	45,036,492	42,310,925	594,244	2,131,323
	1904	60,718,307	56,121,227	610,560	3,986,520
Vessels of 5 gross tons and over					
	1909	40,145,084	37,718,018	449,089	1,977,977
	1904	57,193,223	53,119,935	463,018	3,610,270
Boats of less than 5 gross tons					
	1909	4,891,408	4,592,907	145,155	153,346
	1904	3,525,084	3,001,292	147,542	376,250
Repair work					
	1909	38,304,658	26,678,643	80,461	11,545,554
	1904	32,513,533	22,829,040	46,782	9,637,711
All other work done					
	1909	16,667,904	4,370,747	102,001	12,195,158
	1904	7,460,210	3,818,972	(¹)	3,641,238

¹ Included with repair work.

Table 28 shows the value of the work done in the privately operated shipbuilding establishments in 1909, 1904, and 1899, the total being subdivided so as to show the value of work on new vessels of each of the several main types, the amount received for repair

work, and the value of all other work done during the year.

KIND OF WORK.	VALUE OF WORK DONE DURING THE YEAR BY PRIVATE ESTABLISHMENTS IN SHIPBUILDING INDUSTRY.		
	1909	1904	1899
Total	\$73,360,315	\$32,769,239	\$74,532,277
Work during the year on new vessels and boats	42,310,925	56,121,227	37,719,308
Vessels of 5 gross tons and over	37,718,018	53,119,935	35,750,473
Iron and steel construction	30,038,672	43,395,704	25,454,943
Wooden construction	7,679,346	9,724,231	10,295,530
Boats of less than 5 gross tons	4,592,907	3,001,292	1,968,835
Steam	20,800		
Motor (gasoline, electric, other)	3,155,375	1,879,238	1,059,365
Sailboats, rowboats, canoes, scows, etc.	1,416,732	1,122,004	909,470
Repair work	26,678,643	22,829,040	23,134,436
Iron and steel	15,862,659	12,191,854	12,302,960
Wooden	10,815,984	10,637,186	10,831,476
All other work done	4,370,747	3,818,972	13,678,533

The value of repair work in private yards, both on iron and steel and on wooden vessels, decreased from 1899 to 1904. From 1904 to 1909, on the other hand, there was an increase of 30.1 per cent in the value of repair work on iron and steel vessels in such yards, and of 1.7 per cent in that on wooden vessels.

Table 29 shows, by states, the value of the repair work done in the private establishments in the shipbuilding industry for the last three census years.

STATE.	VALUE OF REPAIR WORK REPORTED BY PRIVATE ESTABLISHMENTS IN THE SHIP BUILDING INDUSTRY.		
	1909	1904	1899
United States	\$26,678,643	\$22,829,040	\$23,134,436
California	2,529,188	2,180,542	2,348,017
Connecticut	319,591	356,032	310,610
Delaware	348,539	454,780	386,841
Florida	536,584	116,360	203,984
Illinois	411,230	439,509	484,541
Indiana	70,663	(¹)	(¹)
Iowa	42,474	31,075	23,366
Kentucky	85,902	(¹)	(¹)
Louisiana	364,738	(¹)	(¹)
Maine	346,635	297,855	642,195
Maryland	985,112	1,010,622	1,138,420
Massachusetts	874,433	854,036	1,603,716
Michigan	1,126,544	688,482	1,027,923
Minnesota	136,063	55,900	78,597
Mississippi	50,484	125,951	42,417
New Jersey	3,123,032	2,254,794	2,229,431
New York	6,961,117	6,729,959	4,857,916
North Carolina	86,569	63,900	65,935
Ohio	1,324,168	1,229,123	1,241,122
Oregon	100,783	184,276	352,562
Pennsylvania	2,531,364	1,762,243	2,716,209
Rhode Island	647,064	660,303	874,065
Virginia	1,324,045	1,157,595	752,971
Washington	880,618	712,851	534,759
West Virginia	136,156	86,595	45,670
Wisconsin	1,172,543	571,746	531,792
All other states	243,011	808,111	606,221

¹ Included in "all other states."

New York was the leading state in value of repair work done in each of the census years shown, and New Jersey was second in 1904 and 1909. The value of repair work in 15 of the states shows an increase over the amount reported for 1904, while 14 states show increases for the decade 1899–1909. The value of repair work formed 36.4 per cent of the total value of products of the shipbuilding industry in 1909, 27.6 per cent in 1904, and 31 per cent in 1899.

Dry docks and marine railways.—When the repair work of shipyards is considered, the question of the

equipment of the various plants naturally arises. Table 30 shows the number and kind of dry docks in private and Government shipyards, classified according to dimensions, for 1909 and 1904.

Table 31 shows statistics relative to the number, dimensions, and lifting capacity of marine railways in operation in 1909 and 1904.

Table 30

CLASS.	DRY DOCKS.	
	1909	1904
Total number.....	216	160
Stationary:		
Wooden.....	57	74
Masonry, concrete, or steel.....	23	
Floating.....	136	86
With floor length of:		
Over 300 feet.....	53	53
201 to 300 feet.....	20	18
101 to 200 feet.....	70	75
100 feet or less.....	73	14
With entrance width of:		
Over 75 feet.....	37	22
51 to 75 feet.....	54	53
26 to 50 feet.....	89	62
25 feet or less.....	36	23
With sill depth of:		
Over 20 feet.....	30	25
10 to 20 feet.....	98	101
Less than 10 feet.....	88	34

Table 31

	MARINE RAILWAYS.	
	1909	1904
Total number.....	678	413
Total lifting capacity, tons.....	147,031	147,047
With cradla length of:		
Over 200 feet.....	38	44
101 to 200 feet.....	110	133
50 to 100 feet.....	178	107
Less than 50 feet.....	370	129
With cradla breadth of:		
Over 50 feet.....	5	16
25 to 50 feet.....	126	140
Less than 25 feet.....	554	257
With maximum cradla draft submerged of:		
Over 15 feet.....	47	51
11 to 15 feet.....	86	99
5 to 10 feet.....	410	221
Less than 5 feet.....	153	42
With lifting capacity of:		
Over 1,000 tons.....	22	34
501 to 1,000 tons.....	56	54
100 to 500 tons.....	172	141
Less than 100 tons.....	446	184

DETAILED STATE TABLES.

The principal data secured by the census inquiry concerning the shipbuilding industry, other than those regarding vessels launched, value of different kinds of work done, and equipment, are presented, by states, in Tables 32 and 33.

Table 33 gives similar statistics in somewhat greater detail for 1909 only.

Table 32 shows, for 1909, 1904, and 1899, the num-

ber of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

SHIPBUILDING, INCLUDING BOATBUILDING—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

Table 32

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1909	1,353	44,949	1,463	2,980	40,508	88,063	\$126, 118	\$4,035	\$25,268	\$31,214	\$73,360	\$42,148
	1904	1,097	54,424	1,190	2,480	50,754	78,127	121,824	3,340	29,241	37,483	82,769	45,306
	1899	1,107			1,405	48,747	81,797	77,341	2,007	24,825	33,476	74,532	41,057
Alabama.....	1909	4	136	3	5	128	322	429	12	62	42	160	118
	1904	7	187	7	6	174	250	309	12	82	68	218	162
	1899	6	300	4	3	293	156	147	4	102	77	240	163
California.....	1909	43	2,008	39	123	1,844	3,129	8,329	218	1,592	1,237	4,132	2,895
	1904	38	709	39	31	839	4,297	693	48	837	500	1,414	914
	1899	39	957	51	21	885	918	299	23	539	702	1,654	952
Connecticut.....	1909	43	502	37	38	427	1,454	1,468	34	254	315	742	427
	1904	46	2,123	45	80	1,998	1,950	1,705	105	987	2,807	4,560	1,753
	1899	35	964	37	12	915	788	602	14	451	680	1,227	547
Delaware.....	1909	10	1,411	8	164	1,239	3,582	2,888	181	697	981	1,990	1,090
	1904	10	1,193	11	60	1,122	1,512	2,630	82	563	895	1,781	886
	1899	9	223	9	7	207	176	225	9	111	153	360	207
Florida.....	1909	52	668	65	21	482	873	1,032	38	289	233	697	464
	1904	13	111	14	6	92	52	84	5	40	37	115	78
	1899	16	159	15	3	141	845	149	3	74	111	255	144
Idaho.....	1909	3	6	4		1	26	9		1	2	8	6
	1904	3	9	4		5	6	17		4	9	19	10
	1899												
Illinois.....	1909	23	470	24	33	413	1,113	2,061	34	252	199	584	385
	1904	21	322	20	14	288	1,191	1,084	17	179	118	414	296
	1899	17	343	19	13	311	221	363	47	159	83	322	239
Indiana.....	1909	15	283	13	17	253	785	484	20	108	243	375	132
	1904	10	326	7	17	302	649	254	18	124	219	478	259
	1899	14	368	16	9	343	328	351	8	160	195	465	270

¹ Excluding statistics for three establishments, to avoid disclosure of individual operations.
² Excluding statistics for two establishments, to avoid disclosure of individual operations.
³ Excluding statistics for one establishment, to avoid disclosure of individual operations.
⁴ Figures can not be shown without disclosing individual operations.

Table 33		PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horse-power.	
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.				Total.	16 and over.		Under 16.			
					Male.	Female.	Average number.	Number, 15th day of—		Male.		Female.	Male.	Female.			
								Maximum month.	Minimum month.								
1	United States.....	1,353	44,949	1,463	1,008	1,706	266	40,506	Ap	42,256	Fe	37,565	44,034	43,564	67	403	88,063
2	Alabama.....	4	136	3	5	.....	.....	128	Ja	162	Se	100	152	151	.....	1	322
3	California.....	43	2,006	39	48	67	3	1,844	No	2,553	My	1,512	2,386	2,378	2	6	3,129
4	Connecticut.....	43	502	37	15	18	5	427	Je	550	Fe	347	428	428	.....	.....	1,454
5	Delaware.....	10	1,411	8	51	94	19	1,239	De	1,541	Au	996	1,560	1,551	.....	9	3,582
6	Florida.....	52	568	65	15	5	1	482	Oc	597	Mh	376	525	524	.....	1	873
7	Idaho.....	3	5	4	.....	.....	.....	1	Je	3	Ja ¹	0	3	3	.....	.....	26
8	Illinois.....	23	470	24	16	13	4	413	Ap	696	No	297	554	553	1	.....	1,112
9	Indiana.....	15	283	13	10	5	2	253	Au	308	Ja	174	259	259	.....	.....	785
10	Iowa.....	17	109	22	4	5	2	76	No	113	Fe	44	114	114	.....	.....	229
11	Kentucky.....	10	179	12	6	4	.....	157	Au	278	Ja	13	168	168	.....	.....	524
12	Louisiana.....	25	431	27	18	11	1	374	Au	433	My	- 319	391	391	.....	.....	1,301
13	Maine.....	156	2,014	173	38	28	20	1,755	Ap	1,975	De	1,530	1,738	1,736	2	.....	2,447
14	Maryland.....	46	1,968	47	77	43	8	1,793	Ap	1,925	Ja	1,533	1,956	1,925	.....	31	6,795
15	Massachusetts.....	115	4,059	124	128	176	27	3,604	Ja	4,180	Au	3,415	3,845	3,685	8	152	3,783
16	Michigan.....	91	2,758	103	46	193	72	2,344	My	3,492	No	1,536	2,206	2,200	6	.....	6,486
17	Minnesota.....	33	257	36	5	4	3	209	Ap	259	Oc	158	191	191	.....	.....	419
18	Mississippi.....	15	111	16	2	2	.....	91	Ja	106	Oc	71	96	96	.....	.....	301
19	New Hampshire.....	8	18	9	.....	.....	.....	9	Jy	12	Ja	6	9	9	.....	.....	41
20	New Jersey.....	97	5,533	97	190	368	9	4,869	Ap	5,223	Fe	4,431	4,881	4,879	2	.....	9,904
21	New York.....	255	6,230	262	119	183	22	5,644	My	6,437	Fe	4,868	5,878	5,868	4	6	13,835
22	North Carolina.....	10	66	12	1	.....	.....	53	Mh	63	De	44	47	47	.....	.....	60
23	Ohio.....	39	3,408	43	51	92	22	3,200	Mh	4,231	Se	1,945	3,485	3,485	.....	.....	8,125
24	Oregon.....	24	250	29	7	1	1	212	Jy	271	Se	153	188	188	.....	.....	287
25	Pennsylvania.....	31	3,833	34	59	178	4	3,558	No	4,148	Fe	3,144	4,097	4,036	7	54	7,771
26	Rhode Island.....	13	596	12	7	40	2	535	My	677	Se	407	551	541	10	.....	1,030
27	Tennessee.....	3	20	5	.....	.....	.....	15	De	21	Jy	11	21	21	.....	.....	20
28	Texas.....	6	45	8	1	.....	.....	36	Fe	46	De	26	43	43	.....	.....	21
29	Vermont.....	7	20	8	.....	.....	.....	11	Je	14	Ja ¹	9	10	10	.....	.....	28
30	Washington.....	60	900	84	39	28	5	744	My	952	Ja	619	852	851	1	.....	2,105
31	West Virginia.....	3	117	4	3	.....	.....	107	No	153	Ja	81	149	149	.....	.....	128
32	Wisconsin.....	52	1,023	52	22	33	10	906	De	1,105	Mh	795	1,150	1,146	2	2	3,506
33	All other states ¹	44	5,623	51	25	112	18	5,417	.....	.....	.....	.....	6,101	5,938	22	141	7,634

¹Same number reported for one or more other months.

DETAILED STATISTICS, BY STATES: 1909.

	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
1	\$126,118,489	\$67,521,967	\$2,292,819	\$1,742,627	\$25,267,686	\$1,191,654	\$30,022,704	\$404,208	\$431,450	\$1,185,579	\$4,983,242	\$73,360,315	\$42,145,957
2	428,844	134,250	12,072	-----	62,292	72	42,210	800	2,149	-----	14,655	159,961	117,679
3	8,329,206	3,948,413	122,450	93,167	1,592,211	73,460	1,163,589	23,662	24,315	273,169	582,390	4,132,176	2,895,127
4	1,467,617	669,723	22,576	11,799	253,664	12,856	302,351	2,791	2,600	1,012	60,074	742,254	427,047
5	2,887,565	1,953,836	103,119	78,198	697,477	41,318	939,335	590	12,365	-----	81,434	1,990,240	1,009,587
6	1,031,592	607,685	30,500	5,015	289,467	9,241	223,316	2,553	5,153	118	42,322	696,644	404,087
7	9,380	3,118	-----	-----	797	30	2,061	-----	47	-----	183	8,420	6,329
8	2,060,884	532,277	22,772	11,079	251,594	21,423	177,332	3,179	12,595	288	32,015	583,783	385,028
9	484,159	387,997	15,016	5,210	106,295	4,780	238,376	192	2,636	-----	15,492	374,511	131,355
10	282,302	158,296	3,160	4,680	48,804	2,813	82,558	800	433	8,550	6,498	182,036	96,665
11	271,390	267,004	5,590	1,300	97,483	393	154,771	901	719	-----	5,847	271,067	115,903
12	629,027	468,948	32,904	6,742	235,699	5,183	149,030	4,923	4,461	-----	30,006	572,602	418,389
13	2,303,770	2,527,170	80,458	31,299	992,328	47,464	1,121,629	6,792	9,395	104,872	132,933	3,061,635	1,892,542
14	4,413,069	3,295,118	122,847	37,233	1,097,846	80,852	1,768,277	12,540	24,353	450	150,720	3,534,575	1,685,446
15	7,399,176	6,643,468	384,444	198,632	2,283,250	95,141	2,635,552	46,939	37,547	614,861	347,102	6,995,847	4,265,154
16	6,971,919	4,725,309	128,729	179,767	1,380,081	84,807	2,404,965	12,836	40,359	1,049	492,716	5,033,836	2,544,064
17	380,011	322,923	4,450	3,432	139,049	5,146	152,449	1,221	1,624	-----	15,552	377,423	219,828
18	57,960	124,529	1,200	1,530	51,223	506	65,065	932	433	-----	3,640	161,416	95,845
19	11,495	10,814	-----	-----	4,471	362	4,163	131	60	1,300	327	17,175	12,650
20	19,175,516	8,607,459	247,907	358,316	3,299,635	125,026	4,124,250	52,029	38,845	54,462	309,989	8,840,515	4,501,239
21	14,084,162	9,733,787	304,759	238,171	3,779,531	166,035	3,758,631	138,697	71,868	89,907	1,186,188	11,417,189	7,492,523
22	73,693	79,659	624	-----	25,058	100	47,186	548	329	4,200	1,614	100,254	52,968
23	13,625,199	4,799,707	153,380	105,776	1,704,530	98,317	2,363,525	8,092	49,821	800	315,466	5,676,416	3,214,574
24	240,120	419,974	8,404	1,980	190,203	1,761	202,379	5,674	1,216	275	8,082	477,116	272,976
25	15,208,209	6,001,185	231,688	183,114	2,120,424	108,622	2,600,932	50,520	32,594	24,150	649,141	6,178,145	3,468,591
26	877,443	755,166	21,953	36,426	369,309	16,220	288,108	4,865	2,104	800	15,381	817,281	512,953
27	23,042	19,934	-----	-----	9,278	322	8,857	420	101	-----	956	26,424	17,245
28	23,050	65,842	550	-----	29,524	160	34,218	200	25	-----	1,165	75,662	41,284
29	40,884	9,093	-----	400	3,861	337	4,013	82	119	-----	236	14,010	9,660
30	2,038,706	1,435,384	73,760	27,560	642,582	35,903	526,455	11,407	10,844	3,359	103,514	1,550,187	987,829
31	158,467	128,854	4,000	1,988	57,248	235	59,851	30	731	-----	4,771	151,156	91,070
32	3,024,759	1,542,168	41,615	27,435	540,181	36,288	782,250	2,456	18,587	1,872	91,484	1,894,622	1,081,084
33	18,110,873	7,142,877	111,892	95,378	2,912,291	116,481	3,595,020	7,404	23,022	40	281,349	7,240,737	3,529,236

*"All other states" embrace: Arkansas, 1 establishment; District of Columbia, 2; Georgia, 2; Missouri, 1; South Carolina, 1; South Dakota, 1; Virginia, 26.

AGRICULTURAL IMPLEMENTS

THE AGRICULTURAL IMPLEMENT INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—This industry includes establishments whose products of chief value are machinery or implements designed for use in agriculture. Agricultural implements in general are divided into four groups, namely, implements of cultivation, seeders and planters, harvesting implements, and seed separators. These groups in turn are subdivided into numerous classes. The implements of cultivation include chiefly cultivators, harrows, and plows; seeders and planters include seeders, listers, planters, and drills; harvesting implements include harvesters, hay rakes, forks, stackers, tedders, mowers, and reapers; and seed separators include thrashers, corn huskers, corn shellers, and fanning mills. There are also certain miscellaneous types of agricultural implements which can not be assigned to any one of the four general groups.

The increasing acreage under cultivation and the difficulty of procuring farm hands in the United States, together with the demand for agricultural implements

in foreign markets, have not only brought about a vast growth in the industry but have no doubt been influential factors in the development of more expensive and intricate agricultural machinery.

Comparison with earlier censuses.—At the census of 1849, 1,333 establishments were reported as engaged in the manufacture of agricultural implements, the average number of hands employed in these establishments being 7,220 and the value of their products amounting to \$6,842,611. At the census of 1859, 1,982 establishments, giving employment to an average of 14,814 hands, were reported, the value of their products amounting to \$17,597,960. Table 1 summarizes the statistics of the industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 1	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	640	648	715	910	1,943	2,076	-10.5	-1.2	-9.4	-21.4	-53.2	-6.4
Persons engaged in the industry..	60,229	55,089	57,254	(2)	(2)	(2)	5.2	9.3	-3.8	.....	.....	.....
Proprietors and firm members.....	465	496	626	(2)	(2)	(2)	-25.7	-6.2	-20.8	.....	.....	.....
Salaries employees.....	9,213	7,199	10,046	(2)	(2)	(2)	-8.3	28.0	-28.3	.....	.....	.....
Wage earners (average number).....	50,551	47,394	46,582	38,827	39,580	25,249	8.5	6.7	1.7	(2)	(2)	(2)
Primary horsepower.....	100,601	59,738	70,646	50,395	44,731	26,082	42.4	12.1	27.0	40.2	12.7	71.5
Capital.....	\$256,281,086	\$196,749,700	\$157,707,951	\$145,313,997	\$62,109,668	\$34,834,600	62.5	30.3	24.8	8.5	134.0	78.3
Expenses.....	117,940,357	96,034,800	86,153,374	64,544,574	(2)	(2)	36.9	22.8	11.5	33.5	.....	.....
Services.....	38,748,613	32,575,296	30,814,090	21,811,761	15,359,610	12,151,504	25.7	19.0	5.7	41.3	42.0	26.4
Salaries.....	10,139,998	7,572,646	8,363,210	(2)	(2)	(2)	21.2	33.9	-9.5	.....	.....	.....
Wages.....	28,608,615	25,002,650	22,450,880	(2)	(2)	(2)	27.4	14.4	11.4	.....	.....	.....
Materials.....	60,306,519	48,281,406	43,944,628	31,603,265	31,531,170	21,473,925	37.2	24.9	9.9	39.0	0.2	46.8
Miscellaneous.....	18,885,225	15,178,998	11,394,656	11,129,548	(2)	(2)	65.7	24.4	33.2	2.4	.....	.....
Value of products.....	146,329,268	112,007,344	101,207,428	81,271,651	68,640,486	52,066,875	44.6	30.6	10.7	24.5	18.4	31.8
Value added by manufacture (value of products less cost of materials).....	86,022,749	63,725,938	57,262,800	49,668,386	37,109,316	30,592,950	50.2	35.0	11.3	15.3	33.8	21.3

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

An increase in value of products is shown for each census, the percentage of increase varying from 18.4 for the decade 1879-1889 to 44.6 for the decade 1899-1909. The absolute increase for this latter period was \$45,121,840, of which \$34,321,924 represents the increase from 1904 to 1909. The value of products in 1909 was almost three times as great as that in 1869.

A considerable part of the total value of products represents the value of products other than agricultural implements. So far as these products could be identified, their value in 1909 amounted to \$11,477,829, this figure covering products primarily manufactured in other industries, as follows: Foundry and

machine-shop products, \$8,431,868; carriages and wagons, \$1,921,096; cutlery and edge tools, \$250,824; dairymen's, poulterers', and apiarists' supplies, \$158,185; pumps, not including steam pumps, \$157,892; children's carriages and sleds, \$127,689; windmills, \$90,311; and other miscellaneous products, \$339,964.

On the other hand, agricultural implements were reported in 1909 to the value of \$2,989,276 by establishments engaged primarily in the manufacture of other products.

A noticeable feature of Table 1 is the steady decrease in the number of establishments from 2,076 in 1869 to 640 in 1909.

Salaried employees were included to some extent with wage earners at the earlier censuses. This fact explains, at least in part, the decrease in the number of wage earners shown for the decade 1879-1889. The statistics for 1899 are more nearly comparable with the figures for 1909 than are those for the earlier censuses. Between these two years the average number of wage earners increased 3,969, or 8.5 per cent.

Summary, by states.—Table 2 summarizes the more important statistics of the industry by states, the states being arranged according to the value of products reported for 1909. Some states for which data can not be shown separately rank higher than some named in the table.

Although the manufacture of agricultural implements in 1909 was reported from 39 states, 82.7 per cent of the total value of products for the industry was reported by the 6 leading states. Illinois, with a value of products in 1909 representing 39.1 per cent of the total, is by far the most important state in the industry, ranking first at the censuses of

1909 and 1904, not only in value of products, but also in the average number of wage earners employed and in value added by manufacture. New York ranked second among the states in value of products in 1909, reporting 10.2 per cent of the total, and third in average number of wage earners, with 11.3 per cent of the total, while Ohio was third in value of products and second in number of wage earners. Among the leading states in the industry, Indiana shows the most decided gain in rank, having advanced from sixth place in 1904, as determined by value of products, to fourth place in 1909, from fifth place to fourth in average number of wage earners, and from sixth to second in value added by manufacture. Wisconsin and Michigan each fell back one place in rank in average number of wage earners, value of products, and value added by manufacture.

In general, the states had in 1909 the same, or practically the same, rank in the number of wage earners employed and in the value added by manufacture as in the value of products.

Table 2	STATE.	Number of establishments 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹								
			Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).		Value of products.		Value added by manufacture.	
					1909	1904			1909	1904			1909	1904	1909	1904	1909	1904	1909	1904
	United States	640	50,551	100.0	.....	\$146,329,266	100.0	.....	\$86,022,749	100.0	.....	8.6	6.7	1.7	44.6	30.6	10.7	50.2	35.0	11.3
	Illinois.....	79	19,240	38.1	1 1	57,268,325	39.1	1 1	32,444,218	37.7	1 1	5.5	25.3	-15.8	36.2	49.1	-8.6	40.0	57.0	-10.8
	New York.....	57	5,717	11.3	3 2	14,970,980	10.2	2 2	8,566,330	9.9	3 2	3.0	-9.0	13.1	42.1	14.8	23.8	49.8	18.1	29.0
	Ohio.....	55	5,997	11.9	2 3	14,440,461	9.9	3 3	8,121,942	9.5	4 3	-12.5	6.0	-17.4	3.3	12.0	-7.8	2.6	12.8	-9.0
	Indiana.....	39	4,749	9.4	4 5	13,669,824	9.3	4 6	8,806,009	10.2	2 6	38.9	34.0	3.6	113.1	69.6	25.7	132.0	73.1	34.0
	Wisconsin.....	45	2,704	5.3	5 4	11,411,303	7.8	5 4	7,473,967	8.7	5 4	-17.8	-24.2	8.5	44.7	13.2	27.8	62.7	14.0	42.7
	Michigan.....	32	2,359	4.7	7 6	9,272,787	6.3	6 5	6,382,634	7.4	6 5	21.3	-25.4	62.8	46.3	6.3	37.5	65.4	22.2	35.4
	Pennsylvania.....	36	2,401	4.7	6 7	4,804,521	3.3	7 7	2,722,299	3.2	7 7	53.5	0.3	53.1	50.2	-4.2	56.9	38.5	-7.4	49.6
	Iowa.....	42	1,315	2.6	8 9	4,757,089	3.2	8 9	2,585,973	3.0	8 9	104.7	28.3	59.5	215.2	76.7	78.4	208.2	93.7	59.1
	Minnesota.....	17	1,014	2.0	9 8	3,013,595	2.1	9 8	1,923,149	2.2	9 8	9.3	-13.8	26.7	70.9	4.5	63.5	84.1	7.2	71.8
	California.....	25	622	1.2	11 14	2,669,651	1.8	10 11	1,228,473	1.4	11 11	10.7	29.9	-14.8	96.6	79.9	9.3	50.1	61.7	-7.2
	Georgia.....	17	552	1.1	12 12	1,116,700	0.8	12 13	633,763	0.6	13 14	53.3	-5.5	62.2	51.4	7.4	40.9	78.0	21.9	46.0
	Tennessee.....	16	645	1.3	10 11	1,003,747	0.7	13 14	590,857	0.7	12 13	72.9	5.2	64.3	116.8	30.6	66.1	126.4	29.9	74.3
	Missouri.....	25	438	0.9	14 13	981,458	0.7	14 12	476,967	0.6	14 12	-11.2	-16.6	6.5	2.8	-8.1	11.9	-12.8	-22.6	12.6
	New Jersey.....	10	224	0.4	18 18	754,909	0.5	15 19	428,224	0.5	15 16	52.4	9.8	38.8	202.0	92.6	66.8	219.4	56.2	104.5
	Massachusetts.....	5	346	0.7	16 15	646,534	0.4	16 15	359,893	0.4	16 15	10.9	-17.2	34.0	20.9	-1.1	22.2	12.9	-10.4	26.0
	Vermont.....	11	360	0.7	15 17	581,949	0.4	17 18	310,314	0.4	17 17	70.8	45.7	17.1	57.3	31.7	19.5	50.5	19.2	26.2
	Virginia.....	16	272	0.5	17 16	516,358	0.4	18 17	272,554	0.3	18 18	-2.2	-13.4	12.9	50.4	27.7	17.8	26.5	22.6	6.1
	Kansas.....	18	126	0.2	21 22	368,779	0.3	20 18	206,850	0.2	20 19	.....	20.0	.....	-6.6	.....	.....	.....	8.9	.....
	Connecticut.....	4	191	0.4	19 19	331,542	0.2	21 20	195,527	0.2	21 20	24.0	5.5	17.5	70.3	23.0	38.5	64.7	28.1	28.6
	North Carolina.....	22	132	0.3	20 21	261,819	0.2	22 24	171,850	0.2	22 24	.....	23.4	.....	106.3	.....	.....	.....	.....	.....
	Maine.....	10	121	0.2	22 20	226,308	0.2	23 21	142,036	0.2	23 21	-44.5	-20.9	-29.8	-22.1	9.7	-29.0	-26.0	9.2	-32.3
	Nebraska.....	11	63	0.1	26 27	152,343	0.1	26 27	68,870	0.1	26 27	.....	.....	-13.6	.....	-73.9	.....	.....	.....
	New Hampshire.....	5	24	0.1	29 26	43,280	(1)	30 26	29,040	(1)	29 25	.....	.....	.....	.....	.....	.....	.....	.....
	South Carolina.....	4	15	(1)	30 30	36,300	(1)	31 29	23,910	(1)	30 29	.....	.....	.....	.....	.....	.....	.....	.....
	All other states.....	39	921	1.8	.....	3,028,706	2.1	.....	1,967,091	2.3	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 17. A minus sign (—) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the industry during 1909 was 60,229, of whom 50,551, or

83.9 per cent, were wage earners, 2,489, or 4.1 per cent, proprietors and officials, and 7,189, or 11.9 per cent, were clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 58,517, or 97.2 per cent, were males, and 1,712, or 2.8 per cent, females. Of the total number of females, 61.4 per cent were clerks. The average number of female wage earners (616) formed only 1.2 per cent of the total number of wage earners employed, and the average number of chil-

dren under 16 years of age employed as wage earners was only 206.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	60,229	56,517	1,712
Proprietors and officials.....	2,489	2,445	44
Proprietors and firm members.....	465	448	17
Salaried officers of corporations.....	569	564	5
Superintendents and managers.....	1,455	1,433	22
Clerks.....	7,189	6,137	1,052
Wage earners (average number).....	50,551	49,935	616
16 years of age and over.....	50,345	49,730	615
Under 16 years of age.....	206	205	1

The average number of wage earners in each state, for 1909, 1904, and 1899, is given in Table 17. The average number distributed by sex and age is not shown for the individual states, but Table 18 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners 16 years of age and over were reported from only 15 states; the largest number, 264, was reported for the state of Illinois, and the next largest number, 142, for Indiana. These 2 states combined reported 60.2 per cent of all the wage earners of this class in the industry. The few wage earners under 16 years of age were fairly well distributed among the states.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

Table 4

CLASS.	1909		1904		Per cent of increase: ¹ 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	60,229	100.0	55,089	100.0	9.3
Proprietors and firm members.....	465	0.8	496	0.9	-6.3
Salaried employees.....	9,213	15.3	7,199	13.1	28.0
Wage earners (average number).....	50,551	83.9	47,394	86.0	6.7

¹ A minus sign (-) denotes decrease.

Table 5 shows the average number of wage earners in the industry distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899. The number of women and children employed was so small that the increase from 1899 to 1909 has little significance.

Table 5

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	50,551	100.0	47,394	100.0	46,582	100.0
16 years of age and over.....	50,345	99.6	47,210	99.6	46,388	99.6
Male.....	49,730	98.4	46,631	98.4	46,174	99.1
Female.....	615	1.2	579	1.2	214	0.5
Under 16 years of age.....	206	0.4	184	0.4	194	0.4

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 13 states in which an average of 500 or more wage earners were employed during the year.

Table 6

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	50,551	51,540	53,673	54,759	53,165	50,990	48,727	45,027	44,906	46,484	49,477	52,410	55,465
California.....	622	577	662	579	702	650	573	526	<i>513</i>	553	612	652	668
Georgia.....	552	555	662	619	512	387	<i>286</i>	316	502	577	632	707	774
Illinois.....	19,240	19,767	19,959	20,168	19,682	19,597	18,596	<i>16,391</i>	16,855	17,952	19,544	20,513	21,855
Indiana.....	4,749	<i>4,330</i>	4,680	4,897	4,816	4,567	4,564	4,552	4,732	4,637	4,882	5,024	5,310
Iowa.....	1,318	1,234	1,331	1,468	1,509	1,392	1,349	1,350	1,263	<i>1,188</i>	1,196	1,225	1,310
Kentucky.....	551	704	733	612	490	239	<i>183</i>	489	530	599	627	693	713
Michigan.....	2,359	2,366	2,498	2,543	2,477	2,373	2,270	2,232	2,251	<i>2,088</i>	2,224	2,454	2,593
Minnesota.....	1,014	983	1,031	1,116	1,107	1,017	1,039	948	919	<i>910</i>	918	1,016	1,169
New York.....	5,717	6,239	6,794	6,918	6,455	6,109	5,551	4,781	<i>3,968</i>	4,440	5,149	5,936	6,278
Ohio.....	5,997	5,682	6,173	6,608	6,721	6,346	6,121	<i>5,547</i>	5,675	5,831	5,719	5,697	5,844
Pennsylvania.....	2,401	2,401	2,400	2,443	2,445	2,421	2,413	2,387	2,414	2,340	2,397	2,382	2,429
Tennessee.....	645	660	682	657	568	<i>567</i>	593	586	<i>623</i>	627	699	736	743
Wisconsin.....	2,704	3,023	3,149	3,086	2,824	2,573	2,515	2,426	<i>2,304</i>	2,335	2,423	2,763	3,025

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the industry during any month of 1909 was 55,465, in December, and the smallest number, 44,906, in August, the minimum number being equal to 81 per cent of the maximum. In 1904 the maximum number, 54,697, was shown for March, and the minimum, 39,656, for September, the latter number being equal to 72.5 per cent of the former.

In the industry as a whole, as well as for the individual states, the greatest activity occurred during the winter and spring months, and for most of the states shown in the table the least number of wage earners was reported for some month of the summer or early fall. For Indiana, the fourth state in respect to value of products, however, the least number of wage earners was reported for January.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for a larger number of states in Table 18.

Prevailing hours of labor.—In Table 7 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or less number of hours.

STATE.	In establishments with prevailing hours—							
	Total.	48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	50,551	453	2,029	4,081	27,549	16,307	131	1
California.....	622	2	.....	584	.....	20	16	.....
Georgia.....	552	.....	3	.....	106	443	.....	.....
Illinois.....	19,240	.....	.....	386	13,664	5,077	113	.....
Indiana.....	4,749	.....	539	459	2,879	872	.....	.....
Iowa.....	1,313	.....	.....	86	493	739	.....	.....
Kentucky.....	551	.....	.....	53	.....	498	.....	.....
Michigan.....	2,359	.....	.....	1,119	787	453	.....	.....
Minnesota.....	1,014	1	.....	6	39	968	.....	.....
New York.....	5,717	20	.....	132	3,549	2,016	.....	.....
Ohio.....	5,997	195	1,294	387	2,354	1,767	.....	.....
Pennsylvania.....	2,401	1	.....	452	850	1,097	.....	i
Tennessee.....	645	1	.....	154	.....	490	.....	.....
Wisconsin.....	2,704	.....	.....	.....	1,906	798	.....	.....

Practically all (94.8 per cent) of the wage earners employed in the industry in 1909 were in establishments embraced in the three groups where the prevailing hours were from 54 to 60, inclusive, per week. Only 4.9 per cent were employed in establishments where the prevailing hours were less than 54 per week, and three-tenths of 1 per cent of the total in establishments where the prevailing hours were more than 60 per week. Of the seven groups shown in Table 7, the largest was that made up of the wage earners in estab-

lishments where the prevailing hours were between 54 and 60 per week, such wage earners constituting 54.5 per cent of the total number. This group was the most important, likewise, in each of the five leading states in the industry as measured by value of products—Illinois, New York, Ohio, Indiana, and Wisconsin. In California and Michigan, however, the wage earners in establishments where the prevailing hours of labor per week were 54 formed the largest group, and in the remaining states the largest group was that made up of the wage earners in establishments where the prevailing hours were 60 per week.

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of the establishments engaged in the industry in the United States.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	640	648	\$146,329,268	\$112,007,344
Individual.....	184	200	2,174,866	2,584,031
Firm.....	¹ 107	121	3,490,827	4,097,433
Corporation.....	349	327	140,663,575	105,325,880
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	28.8	30.9	1.5	2.3
Firm.....	¹ 16.7	18.7	2.4	3.7
Corporation.....	54.5	50.5	96.1	94.0

¹ Includes one establishment under cooperative ownership, to avoid disclosure of individual operations.

In 1909, of the total number of establishments reported for the industry, 54.5 per cent were under corporate ownership, as compared with 50.5 per cent in 1904. In 1909 the value of products of these establishments represented 96.1 per cent of the total, and in 1904, 94 per cent.

Table 9 gives statistics for establishments classified according to form of ownership for each state, with the exception of Kentucky, for which more than 500 wage earners were reported. Kentucky is omitted in order to avoid the disclosure of individual operations.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individu-als.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.
United States.....	184	107	349	965	1,445	48,141	\$2,174,866	\$3,490,827	\$140,663,575	\$1,146,060	\$1,987,099	\$82,889,690
California.....	12	3	10	33	5	584	106,770	27,718	2,535,154	61,104	19,211	1,148,168
Georgia.....	1	9	7	(X)	49	503	(X)	<i>99,060</i>	1,017,640	(X)	49,326	484,438
Illinois.....	17	12	50	62	183	18,995	175,644	354,759	56,737,922	92,927	217,155	32,134,136
Indiana.....	9	4	26	70	9	4,670	193,814	26,895	13,449,115	105,580	12,105	8,688,324
Iowa.....	8	8	26	38	26	1,254	102,783	82,155	4,572,151	44,019	37,005	2,504,949
Michigan.....	8	6	18	45	21	2,293	172,670	52,704	9,047,413	78,872	32,206	6,271,556
Minnesota.....	2	2	13	(X)	10	1,004	(X)	<i>40,465</i>	2,973,130	(X)	<i>28,379</i>	1,894,770
New York.....	10	10	28	145	53	5,519	271,450	245,308	14,454,222	160,578	158,821	8,236,931
Ohio.....	10	4	41	51	148	5,798	122,107	525,896	13,792,458	62,906	267,763	7,791,273
Pennsylvania.....	15	8	13	132	688	1,581	185,171	1,541,739	3,077,611	89,668	897,965	1,734,666
Tennessee.....	4	2	10	<i>65</i>	(X)	580	<i>102,189</i>	(X)	901,558	<i>64,436</i>	(X)	536,421
Wisconsin.....	13	5	27	41	35	2,628	124,187	78,916	11,208,200	68,772	37,558	7,367,637

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for establishments under firm ownership include those for one establishment under cooperative ownership.

In 1909, 965 wage earners, or 1.9 per cent of the total for the industry, were employed in establishments under individual ownership; 1,445, or 2.9 per cent, in those under firm ownership (including one under cooperative ownership); and 48,141, or 95.2 per cent, in those owned by corporations.

There are considerable variations among the different states in the relative importance of the establishments operated by individuals, firms, and corporations, respectively. Thus in Illinois the establishments controlled by corporations constituted 63.3 per cent of the total number of establishments, gave employment to 99.3 per cent of the wage earners, and reported 98.7 per cent of the total value of products. In Pennsylvania, on the other hand, establishments under corporate ownership controlled only 36.1 per cent of the establishments, gave employment to 65.8 per cent of the wage earners, and contributed 64.1 per cent of the total value of products.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

In 1909, 5.3 per cent of the establishments manufactured products valued at \$1,000,000 or over, as against 4.2 per cent in 1904. While such establishments represented a comparatively small proportion of the total number at both censuses, they reported 64.3 per cent of the total value of products in 1909 and 52.2 per cent in 1904.

On the other hand, the small establishments—that is, those manufacturing products valued at less than \$20,000—constituted more than one-half (51.3 per cent) of the total number of establishments in 1909,

but the value of their products amounted to only 1.5 per cent of the total. The corresponding proportions for these establishments at the census of 1904 were 47.1 per cent and 1.7 per cent, respectively. More than nine-tenths of the output of all establishments in the industry, as measured by value, was turned out in both years by those having products valued at \$100,000 or over, such establishments reporting 93.8 per cent of the total value of products in 1909 and 90.8 per cent in 1904.

Table 10

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	640	648	\$146,329,268	\$112,007,344
Less than \$5,000.....	156	153	359,971	369,294
\$5,000 and less than \$20,000.....	172	152	1,827,822	1,537,789
\$20,000 and less than \$100,000.....	142	175	6,927,862	8,423,972
\$100,000 and less than \$1,000,000.....	136	141	43,075,407	43,190,469
\$1,000,000 and over.....	34	27	94,138,206	58,479,820
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	24.4	23.6	0.2	0.3
\$5,000 and less than \$20,000.....	26.9	23.5	1.3	1.4
\$20,000 and less than \$100,000.....	22.2	27.0	4.7	7.5
\$100,000 and less than \$1,000,000.....	21.2	21.8	29.4	38.6
\$1,000,000 and over.....	5.3	4.2	64.3	52.2

The average value of products per establishment increased from \$172,851 in 1904 to \$228,639 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$98,342 to \$134,411. The average number of wage earners per establishment shows an increase from 73.1 in 1904 to 79 in 1909.

Classification by number of wage earners.—Table 11 classifies the establishments in the 13 leading states according to the number of wage earners employed.

Table 11

ESTABLISHMENTS EMPLOYING IN 1909—

STATE.	TOTAL.		No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Estab-lish-ments.	Wage earners (average number).	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.....	640	50,551	40	246	589	126	1,478	84	2,724	49	3,682	49	7,911	28	9,991	11	7,994	7	16,182	
California.....	25	622	1	15	38	4	43	2	48	1	52	3	441	.....	.....	.....	.....	.....	.....
Georgia.....	17	552	1	6	11	5	48	2	54	1	74	2	365	.....	.....	.....	.....	.....	.....
Illinois.....	79	19,240	5	16	35	17	186	5	172	9	618	13	1,839	6	2,108	4	3,067	4	11,165	
Indiana.....	39	4,749	2	12	25	9	119	6	147	3	276	2	352	3	1,397	1	523	1	1,910	
Iowa.....	42	1,318	1	19	45	7	75	9	277	3	224	2	403	1	294	.....	.....	.....	.....
Kentucky.....	6	551	.....	2	6	1	13*	2	76	.....	.....	.....	.....	1	456	.....	.....	.....	.....
Michigan.....	32	2,359	2	12	31	4	67	6	207	2	146	1	170	5	1,738	.....	.....	.....	.....
Minnesota.....	17	1,014	1	3	7	8	94	.....	.....	3	219	.....	.....	2	694	.....	.....	.....	.....
New York.....	57	5,717	2	22	53	9	125	13	485	4	321	1	150	2	688	3	2,130	1	1,765	
Ohio.....	55	5,997	3	12	33	8	90	10	318	3	227	13	2,170	4	1,287	1	530	1	1,342	
Pennsylvania.....	36	2,401	5	13	23	4	53	4	139	4	327	4	650	1	405	1	804	.....	.....
Tennessee.....	16	645	.....	8	14	2	16	2	81	3	207	.....	.....	1	327	.....	.....	.....	.....
Wisconsin.....	45	2,704	5	17	42	10	135	4	127	2	179	4	684	2	597	1	940	.....	.....

Of the 640 establishments reported in 1909, 6.3 per cent employed no wage earners, 38.4 per cent employed from 1 to 5, 19.7 per cent from 6 to 20, and 13.1 per cent from 21 to 50. There were 144 establish-

ments that employed an average of more than 50 wage earners, and of these, 18 employed over 500.

Of the total number of wage earners, 16.8 per cent were reported by establishments employing from 1 to

100, 15.6 per cent by establishments employing from 101 to 250, and 19.8 per cent by establishments employing from 251 to 500. Almost one-half of the total number of wage earners (24,176, or 47.8 per cent), worked in establishments employing over 500 each.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$117,940,357, distributed as follows: Cost of materials, \$60,306,519, or 51.1 per cent; wages, \$28,608,615, or 24.3 per cent; salaries, \$10,139,998, or 8.6 per cent; and miscellaneous expenses, made up of advertising, traveling expenses, ordinary repairs of buildings and machinery, taxes, insurance, and other sundry expenses, \$18,885,225, or 16 per cent. These proportions, as may be seen by comparing the items in Table 18, vary somewhat in the several states.

Engines and power.—Table 12 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in establishments manufacturing agricultural implements increased from 70,646 horsepower in 1899 to 100,601 horsepower in 1909, or 42.4 per cent. Although power generated by steam engines decreased slightly between 1904 and 1909, it retained its position as the principal kind of power, representing 71 per cent in 1909, 83.6 per cent in 1904, and 86.6 per cent of the total in 1899. Water power, which in 1899 formed 9.6 per cent of the total primary power, constituted only 8.3 per cent in 1909,

but there was an increase in the relative importance of power generated by gas and other internal-combustion engines. The most noticeable gain, however, was in rented electric power, which increased from 1,100 horsepower in 1899 to 15,684 horsepower, or more than fourteen times as much, in 1909. Rented electric power formed 15.6 per cent of the total primary power in 1909, as compared with 4.3 per cent in 1904, and 1.6 per cent in 1899.

The number and horsepower of electric motors used for distributing power by means of current generated in the establishments in the industry also show a very decided increase.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	1,794	1,177	812	100,601	89,738	70,846	100.0	100.0	100.0
Owned.....	862	995	912	84,717	85,835	69,280	84.2	95.6	98.1
Steam.....	504	698	678	71,394	75,018	61,147	71.0	83.6	86.6
Gas.....	261	165	75	4,433	2,360	1,055	4.4	2.6	1.5
Water wheels.....	96	128	159	8,387	6,288	6,758	8.3	7.0	9.6
Water motors.....	1	4	(¹)	3	12	(¹)	(²)	(²)	.....
Other.....	.....	.....	.....	500	2,157	320	0.5	2.4	0.5
Rented.....	932	182	(¹)	15,884	3,903	1,366	15.8	4.3	1.9
Electric.....	932	182	(¹)	15,684	3,828	1,100	15.6	4.3	1.6
Other.....	.....	.....	.....	200	75	266	0.2	0.1	0.4
Electric motors.....	2,057	872	193	38,905	20,713	7,643	100.0	100.0	100.0
Run by current generated by establishment.....	1,125	690	193	23,221	16,885	6,543	59.7	81.5	85.6
Run by rented power.....	932	182	(¹)	15,684	3,828	1,100	40.3	18.5	14.4

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 13 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in the 13 leading states.

STATE.	PRIMARY HORSEPOWER.		OWNED BY ESTABLISHMENTS REPORTING.					RENTED.		ELECTRIC HORSEPOWER.		FUEL USED.					
	Number of establishments reporting.	Total horsepower.	Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec.	Other.	Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
												Anthracite (long tons).	Bituminous (short tons).				
United States.....	800	100,601	84,717	71,394	4,433	8,390	500	15,684	200	38,905	23,221	15,114	550,085	98,819	14,528	244,758	313,412
California.....	25	1,186	507	335	172	.....	.....	879	.....	711	32	174	266	294	.....	8,962	16
Georgia.....	14	1,307	1,127	1,079	48	.....	.....	180	.....	855	675	.....	4,900	1,357	.....	76	180
Illinois.....	75	38,040	32,317	31,575	222	520	.....	5,535	188	18,698	13,163	800	287,554	38,363	8,643	135,401	2,890
Indiana.....	36	9,254	8,221	5,002	119	3,100	.....	1,033	.....	2,480	1,447	195	44,643	14,588	225	3,555	3,811
Iowa.....	42	2,554	1,897	1,589	278	30	.....	657	.....	753	96	28	16,139	1,154	24	1,020	166
Kentucky.....	5	772	734	710	24	.....	.....	38	.....	501	463	.....	3,033	1,000	.....	3,255	200
Michigan.....	30	5,195	3,705	3,540	115	50	.....	1,490	.....	2,243	753	45	23,895	3,543	221	10,456	.....
Minnesota.....	16	1,468	1,380	1,355	25	.....	.....	88	.....	508	420	22	10,443	1,485	2,179	1,145	.....
New York.....	56	10,744	9,298	8,612	268	2,420	.....	1,436	10	2,869	1,433	5,651	58,963	10,745	1,595	43,191	27,910
Ohio.....	50	9,867	9,010	7,360	1,562	88	.....	857	.....	3,406	2,549	.....	44,610	8,967	13	11,896	240,768
Pennsylvania.....	31	3,842	2,821	2,708	115	.....	.....	1,021	.....	1,638	617	2,622	12,589	3,045	584	9,490	2,062
Tennessee.....	15	1,336	1,236	1,172	64	.....	.....	.....	.....	567	567	11	4,976	4,437	200	87	.....
Wisconsin.....	41	7,301	5,780	5,069	211	.....	600	1,521	.....	2,006	485	841	19,896	5,482	73	9,201	898
All other states.....	164	7,835	6,684	3,290	1,212	2,182	.....	1,149	2	1,670	521	4,725	18,278	4,359	761	7,018	34,711

In 1909 Illinois, New York, Ohio, Indiana, and Wisconsin together reported 75,206 horsepower, or 74.8 per cent of the aggregate for the industry. Steam

was the most important form of power in all of the states shown separately except California, where rented electric power was used to a greater extent

than any other form of power. The largest amount of steam power, 31,575 horsepower, representing 44.2 per cent of the total, was reported by Illinois, and the largest amount of water power, 3,100 horsepower, by Indiana. Illinois reported by far the largest amount of rented electric power, 5,535 horsepower, or more than one-third of the total for the United States. Of the power generated by gas and other internal-combustion engines, the greatest amount, 1,562 horsepower, was reported for Ohio.

Fuel consumed.—Bituminous coal was the principal class of fuel used in the industry, 550,085 short tons being consumed during 1909, of which amount 287,554 tons, or 52.3 per cent, were used in Illinois. The largest quantity of anthracite coal, 5,651 long tons, or more than one-third of the total for the industry, was reported for New York. Gas and oil were used to a considerable extent, by far the largest quantity of gas being reported for Ohio, and of oil for Illinois.

SPECIAL STATISTICS RELATING TO PRODUCTS.

Table 14 shows statistics of the products of the establishments in the industry for 1909, 1904, and 1899.

PRODUCT.	1909	1904	1899
Total value.....	\$146,329,268	\$112,007,344	\$101,207,428
Implements of cultivation.....	35,246,030	30,607,960	98,010,506
Seeders and planters.....	13,679,921	11,225,122	
Harvesting implements.....	34,568,131	30,862,435	
Seed separators.....	11,030,412	6,639,883	
All other products.....	48,690,082	30,703,648	
Amount received for repair work.....	3,114,692	1,968,296	3,196,922
<i>Principal kinds of implements.</i>			
Implements of cultivation:			
Cultivators—	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>
Beet.....	3,172	3,459	2,008
Small.....	469,696	239,173	207,171
Wheeled.....	435,429	313,088	295,799
Cotton scrapers.....	20,180	22,519	15,230
Harrows—			
Disk.....	193,000	104,323	97,261
Spring-tooth.....	112,832	86,408	380,259
Spike-tooth.....	394,988	262,442	
Plows—			
Disk.....	22,132	39,146	17,345
Gang.....	91,686	(²)	(²)
Shovel.....	254,737	121,899	102,320
Steam.....	2,355	1,599	207
Sulky or wheel.....	134,936	138,899	136,105
Walking.....	1,110,006	956,898	819,022
Seeders and planters:			
Seeders—			
Broadcast.....	38,007	33,546	36,862
Combination.....	23,963		
Corn planters—			
Hand.....	96,465	86,553	129,515
Horse.....	122,780	90,929	78,335
Listers.....	44,840	23,012	26,995
Potato planters.....	79,271	127,052	45,575
Drills—			
Corn.....	20,137	28,228	21,940
Disk.....	21,292	(²)	(²)
Grain.....	68,611	76,929	91,635
All other.....	32,507	606	5,302
Seed sowers.....	7,847	59,910	83,283
Harvesting implements:			
Grain cradles.....	22,635	30,056	36,163
Harvesters—			
Bean.....	1,409	665	1,425
Corn.....	19,693	6,924	20,707
Grain.....	129,274	108,810	233,542
Harvesters and thrashers combined.....	543	(²)	(²)
Other.....	1,707	3,161	6,283
Hay carriers.....	45,064	85,121	54,303
Hayforks, horse.....	43,675	62,801	51,770
Hay loaders.....	34,705	27,174	7,273
Hayrakes, horse.....	266,260	236,297	215,345
Haystackers.....	17,212	8,670	12,069
Hay tedders.....	34,396	35,745	14,510
Mowers.....	359,264	273,385	398,616
Potato diggers, horse.....	25,632	11,703	(²)
Reapers.....	58,294	60,996	35,945
Seed separators:			
Clover hullers.....	437	351	661
Corn huskers.....	372	1,327	10,726
Corn huskers and shredders.....	1,240	.....	.....
Corn shellers—			
Hand.....	74,223	47,189	106,381
Power.....	9,049	6,082	8,185
Fanning mills.....	33,805	22,894	30,369
Thrashers—			
Horse power.....	822	2,237	1,314
Steam power.....	23,586	7,950	3,651

The value of products increased from \$101,207,428 in 1899 to \$146,329,268 in 1909, or 44.6 per cent. The value of products in 1909 included a large amount (\$48,690,082, or one-third of the total value of products for the industry) which represented the value of products that could not be classified with either of the four general groups of products. Of this amount, \$11,477,829, as stated in the discussion of Table 1, was found to represent products other than agricultural implements, leaving \$37,212,253 which it was impracticable to account for in detail. Much of this represents the value of parts and attachments of agricultural implements, traction engines, hay presses, tobacco presses, manure spreaders, wagons, cane mills, windmills, wheelbarrows, dairy machinery, road scrapers, water tanks, evaporators, and various kinds of hand tools, like scythes, shovels, and spades. Thus, although many of these products are directly associated with agriculture, there are many which are common to agricultural and to other pursuits, and still others which are not generally used as agricultural implements.

In 1909 the aggregate value of the four groups of agricultural implements—seeders and planters, implements of cultivation, harvesting implements, and separators—for which separate figures are presented, was \$94,524,494, as compared with \$79,335,400 in 1904, representing an increase of 19.1 per cent during the five-year period.

A comparison of the numbers of the various classes of agricultural machinery reported at the several censuses is of little value, since each class includes a considerable variety of implements and the make-up of the class may change from census to census, either by reason of improvements in the machinery or by reason of changes in the type of machinery most extensively used.

Principal classes of products, by states.—Table 15 shows, by states, the values reported for the four main groups of agricultural implements for 1909 and 1904. Statistics of this kind are not available for 1899.

The value reported for implements of cultivation shows an increase of \$4,638,070, or 15.2 per cent, between 1904 and 1909. Illinois was the leading state in the manufacture of this class of agricultural implements, reporting approximately two-fifths of

¹ In addition, agricultural implements to the value of \$2,989,276 in 1909, and to the value of \$1,349,679 in 1904, were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.
² Not reported separately.

the total value of such implements for the United States at both censuses, while Indiana ranked second.

	1909	1904
IMPLEMENTS OF CULTIVATION.		
United States.....	\$35,246,030	\$30,607,960
Illinois.....	14,422,970	12,273,939
Indiana.....	4,606,748	3,346,695
New York.....	3,348,203	2,545,947
Ohio.....	3,062,194	3,031,384
Wisconsin.....	2,324,579	2,219,657
Michigan.....	1,150,827	1,313,564
Pennsylvania.....	1,147,063	987,619
HARVESTING IMPLEMENTS.		
United States.....	34,568,131	30,862,435
Illinois.....	22,417,070	16,874,413
New York.....	5,950,777	5,541,889
Ohio.....	2,675,727	3,193,853
Iowa.....	1,157,701	868,104
California.....	860,062	413,262
SEEDERS AND PLANTERS.		
United States.....	13,679,921	11,225,122
Illinois.....	5,680,631	2,593,075
Ohio.....	2,245,512	2,016,919
Wisconsin.....	1,639,295	911,438
Indiana.....	1,499,639	694,047
Michigan.....	640,001	1,004,734
SEED SEPARATORS.		
United States.....	11,030,412	6,639,883
Indiana.....	2,748,913	718,575
Illinois.....	1,847,026	915,095
Michigan.....	1,753,043	1,479,173
Wisconsin.....	1,435,296	1,035,688
Ohio.....	858,106	501,482
Pennsylvania.....	828,617	489,956
New York.....	790,494	461,814

Harvesting implements show an increase in value of \$3,705,696, or 12 per cent, between 1904 and 1909.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning establishments engaged in the manufacture of agricultural implements are presented by states in Tables 17 and 18.

Table 17 shows for 1909, 1904, and 1899 the number

Illinois reported 64.8 per cent of the total value in 1909, and New York, the second state, 17.2 per cent. The value reported for seeders and planters increased \$2,454,799, or 21.9 per cent, between 1904 and 1909, Illinois also reporting a larger proportion of the total for this class than any other state (41.5 per cent in 1909), and Ohio ranking second. Seed separators show an increase of \$4,390,529, or 66.1 per cent, in value from 1904 to 1909. Indiana, the leading state in 1909, reported 24.9 per cent of the total value.

Exports.—Table 16 shows the value of the exports of agricultural implements for the fiscal years (ending June 30) 1870, 1880, 1890, and 1900, and for each succeeding year to 1909, inclusive.

YEAR ENDING JUNE 30—	VALUE OF EXPORTS OF AGRICULTURAL IMPLEMENTS. ¹			
	Total.	Mowers and reapers, in- cluding parts.	Plows and cultivators, including parts.	All other implements, including parts.
1870.....	\$1,068,476	\$65,533	\$143,527	\$859,416
1880.....	2,245,742	768,945	169,211	1,307,586
1890.....	3,859,184	2,092,638	878,784	887,762
1900.....	16,099,149	11,243,763	2,178,098	2,677,288
1901.....	16,313,434	9,943,680	1,888,373	4,481,381
1902.....	16,286,740	8,818,370	2,791,092	4,677,278
1903.....	21,006,622	10,326,641	3,169,961	7,510,020
1904.....	22,749,635	11,568,062	3,537,810	7,643,763
1905.....	20,721,741	10,559,891	2,892,060	7,269,790
1906.....	24,554,427	12,150,101	4,128,331	8,275,995
1907.....	26,936,456	15,078,231	3,492,073	8,366,152
1908.....	24,344,398	13,750,434	3,139,496	7,454,468
1909.....	25,694,184	14,052,083	3,795,800	7,846,301

¹ Figures taken from the Statistical Abstract of the United States, issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture, while Table 18 gives more detailed statistics for the industry, for 1909 only.

SLAUGHTERING AND MEAT PACKING

THE SLAUGHTERING AND MEAT PACKING INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—The slaughtering and meat packing industry, according to the classification adopted for the presentation of the statistics at the census of 1909, includes wholesale slaughtering and meat packing establishments, public abattoirs, and establishments making a specialty of manufacturing sausage. It does not include the retail butchering establishments. It is impossible, however, to draw a hard and fast line between the wholesale and retail business. The operations of butchers, whose main business was slaughtering for the retail trade but who also disposed of considerable quantities of meat at wholesale, were intended to be included, and the reports for such establishments ordinarily covered both their retail and their wholesale business. Establishments properly included in the wholesale industry at one census might, on account of changes in the character of their business, properly be omitted at another census, although still in operation; and even at the same census establishments of identical characteristics may have been treated differently by the special agents in different sections of the country. The statistics for the industry, however, may be accepted as representing practically all important establishments engaged wholly, or chiefly, in slaughtering and meat packing, in slaughtering, and in the manufacture of sausage for the wholesale trade.

The present report distinguishes three classes of establishments: (1) Those whose chief products are cured and packed meats; (2) those whose chief products are fresh meats; and (3) those whose chief product is sausage. In compiling the statistics each establishment was assigned to one of the three groups according to its product of chief value. Many of the establishments engaged chiefly in meat packing also slaughter, and although all establishments classed as engaged in "slaughtering" are those that have fresh meat for their product of chief value, there are some of them that do a limited amount of meat packing also. So many establishments in the industry engage in two or even all three of these branches combined that the overlapping of products makes advisable the presentation in most of the tables of the totals for the combined industries only.

The figures regarding cost of materials and value of products in the various tables of this bulletin contain a considerable amount of duplication. Those establishments, for example, which are engaged in meat packing only, or in making sausage only, use as ma-

terials the fresh meat produced by the slaughtering branch of the industry. Dressed meat valued at \$93,409,286 was reported in 1909 as among the materials purchased by the establishments in the industry. This may be said to represent roughly the amount of duplication involved in cost of materials and in value of products as reported for the combined industry. In the statistics of "value added by manufacture" this duplication is almost entirely eliminated.

Summary for the industry: 1909.—Table 1 presents a summary of the statistics for the slaughtering and meat packing industry as a whole and for each of its branches for 1909.

Table 1	Total for the industry.	ESTABLISHMENTS ENGAGED PRIMARILY IN—		
		Slaughtering and meat packing.	Slaughtering, not including meat packing.	The manufacture of sausage.
Number of establishments.....	1,641	656	565	420
Persons engaged in the industry.....	108,716	97,476	8,495	2,745
Proprietors and firm members.....	1,659	478	692	489
Salaried employees.....	17,329	15,603	1,385	341
Wage earners (average number).....	89,728	81,395	6,418	1,915
Primary horsepower.....	208,707	184,624	17,808	6,275
Capital.....	\$383,249,170	\$343,636,900	\$34,682,145	\$4,930,125
Expenses.....	1,317,366,878	1,160,119,929	143,730,165	13,516,784
Services.....	71,698,677	63,589,431	6,533,335	1,575,911
Salaries.....	20,053,957	17,849,895	1,868,417	335,645
Wages.....	51,644,720	45,739,536	4,664,918	1,240,266
Materials.....	1,202,827,784	1,059,256,121	132,201,955	11,389,708
Miscellaneous.....	42,840,417	37,294,377	4,994,875	551,165
Value of products.....	1,370,568,101	1,204,248,578	151,295,853	15,023,670
Value added by manufacture (value of products less cost of materials).....	167,740,317	145,012,457	19,093,898	3,633,962

In 1909 the establishments in the industry as a whole gave employment to an average of 108,716 persons, of whom 89,728 were wage earners, and paid out \$71,698,677 in salaries and wages. The cost of materials (\$1,202,827,784) was equal to 87.8 per cent of the total value of products (\$1,370,568,101), while the value added by manufacture (that is, the value of products less the cost of materials) was \$167,740,317.

Of the 1,641 establishments canvassed in 1909, 656, or 40 per cent, were engaged primarily in slaughtering and meat packing; these establishments employed 90.7 per cent of the total number of wage earners and contributed products to the value of \$1,204,248,578, or 87.9 per cent of the total for the industry as a whole. Although establishments engaged chiefly in slaughtering formed approximately one-third (34.4 per cent) of the total number, they

employed only 7.2 per cent of the total number of wage earners, and the value of their products represented but 11 per cent of the total for the entire industry. The 420 establishments engaged chiefly in the manufacture of sausage reported 2.1 per cent of the wage earners and contributed 1.1 per cent of the total value of products. In the case of establishments engaged primarily in meat packing, the cost of materials equaled 88 per cent of the value of products; in the case of those engaged primarily in slaughtering, 87.4 per cent; and of those making sausage, 75.8 per cent.

Of the 656 establishments in 1909 doing slaughtering and meat packing, 159 did no slaughtering, but were engaged exclusively in packing meats. Of the 565 establishments engaged chiefly in slaughtering, 31 were abattoirs in which animals were slaughtered for others, including both the wholesale and retail meat dealers; the value of products for the latter class of establishments represents chiefly the amount received for slaughtering. The conditions under which these two classes of establishments are operated differ so materially from those prevailing in the other establishments in this industry that it has seemed best to show the statistics for them in a separate table. These statistics are given in Table 2.

	Establishments engaged in meat packing only: 1909	Abattoirs: 1909
Number of establishments.....	159	31
Persons engaged in the industry.....	6,081	488
Proprietors and firm members.....	159	.....
Salaried employees.....	1,164	55
Wage earners (average number).....	4,758	433
Capital.....	\$18,236,059	\$1,196,346
Expenses.....	51,838,950	518,461
Services.....	4,123,834	275,887
Salaries.....	1,299,610	53,477
Wages.....	2,824,224	222,410
Materials.....	45,094,837	136,838
Miscellaneous.....	2,620,279	106,036
Value of products.....	56,212,973	¹ 653,042
Value added by manufacture (value of products less cost of materials).....	11,118,136	516,504

¹ Amount received for custom work.

Comparison with earlier censuses.—The statistics relative to the manufacture of sausage were not shown separately prior to 1889. Statistics for this branch of the industry may have been included with the figures for slaughtering and meat packing or may have been omitted from the census reports altogether. At the census of 1849 the industry as a whole was called "pork and beef packing," and in that of 1859 it was included under the designation of "provisions." In 1869 the statistics of the industry were collected under four headings, namely, "meat packed, beef," "meat packed, pork," "meat cured and packed, not specified," and "butchering," while the designation used in 1879 was "slaughtering and meat packing, not including retail butchering." In 1889, 1899, and 1904 separate figures were secured for "slaughtering and meat packing, wholesale," "slaughtering, wholesale, not including meat packing," and "sausage." The designation "slaughtering and meat packing," used in 1909, covers the three classes of establishments for which separate statistics were published in 1904 and at the two censuses preceding. Even a cursory examination of the titles applied to the industry at successive censuses makes evident the fact that different classes of establishments were included at different times, although the totals for the censuses from 1889 to 1909, inclusive, are fairly comparable.

The number of establishments in the industry as a whole increased 20 per cent from 1889 to 1909. The decrease shown for the period from 1889 to 1899 was due probably to the inclusion at the earlier census of some small establishments which were omitted from the reports for subsequent years. The number of wage earners more than doubled during the 20-year period, while the value of products increased 142.7 per cent and the cost of materials 149.1 per cent.

Table 3 summarizes the statistics of the slaughtering and meat packing industry as a whole for each census from 1889 to 1909, inclusive.

	SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED.							
	Number or amount.				Percent of increase. ¹			
	1909	1904	1899	1889	1899-1909	1904-1909	1899-1904	1889-1899
Number of establishments.....	1,641	1,221	1,080	1,367	51.9	34.4	13.1	-21.0
Persons engaged in the industry.....	108,716	88,819	(²)	(²)	.....	22.4	.....	.....
Proprietors and firm members.....	1,659	1,324	(²)	(²)	.....	25.3	.....	.....
Salaried employees.....	17,329	12,096	10,317	(²)	68.0	43.3	17.2	.....
Wage earners (average number).....	89,728	75,399	69,264	44,812	26.6	19.0	8.9	(³)
Primary horsepower.....	208,707	119,311	87,090	48,244	139.7	74.9	37.0	80.5
Capital.....	\$383,249,170	\$240,418,936	\$190,209,078	\$118,016,066	101.6	59.4	26.4	61.2
Expenses.....	1,317,366,878	896,880,868	763,532,149	528,132,885	74.8	46.9	19.0	42.7
Services.....	71,698,677	54,519,995	44,056,388	29,403,249	62.7	31.5	23.8	49.8
Salaries.....	20,053,957	13,453,199	10,210,715	(²)	.....	49.1	31.8	.....
Wages.....	61,644,720	41,066,796	33,845,673	(²)	52.6	25.8	21.3	.....
Materials.....	1,202,827,784	811,425,562	685,310,099	482,697,381	75.5	48.2	18.4	41.9
Miscellaneous.....	42,840,417	30,935,311	24,165,662	15,832,255	77.3	38.5	28.0	52.6
Value of products.....	1,370,568,101	922,037,528	788,367,647	564,667,035	73.8	48.6	17.0	39.6
Value added by manufacture (value of products less cost of materials).....	167,740,317	110,611,966	103,057,548	81,769,654	62.8	51.6	7.3	26.0

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

Table 4 shows statistics for the slaughtering and meat packing industry as a whole for the censuses from 1869 to 1909, inclusive.

CENSUS.	Number of establishments	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	1,641	89,728	\$51,644,720	\$1,202,827,784	\$1,370,568,101	\$167,740,317
1904.....	1,221	75,399	41,066,796	811,425,562	922,037,528	110,611,966
1899.....	1,080	69,264	33,845,673	685,310,099	788,367,647	103,057,548
1889.....	1,367	44,812	24,668,202	482,897,381	564,667,035	81,769,654
1879.....	872	27,297	10,508,530	267,738,902	303,562,413	35,828,511
1869.....	768	8,366	2,553,447	61,674,024	75,826,500	14,152,476

As already explained, the figures prior to 1889 are not strictly comparable with those for later years, but they will serve to show in a general way the great development of the industry. The financial statistics for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Comparisons with earlier censuses for the three branches of the industry.—Table 5 shows the statistics for the three branches of the industry separately for 1909 and 1899 and the percentage of increase in each during the decade.

Table 5	ESTABLISHMENTS ENGAGED PRIMARILY IN—								
	Slaughtering and meat packing.			Slaughtering, not including meat packing.			The manufacture of sausage.		
	1909	1899	Per cent of increase.	1909	1899	Per cent of increase.	1909	1899	Per cent of increase.
Number of establishments.....	656	557	17.8	565	325	73.8	420	198	112.1
Persons engaged in the industry.....	97,476	(1)	.....	8,495	(1)	.....	2,745	(1)	.....
Proprietors and firm members.....	478	(1)	.....	692	(1)	.....	489	(1)	.....
Salaried employees.....	15,603	9,635	61.9	1,385	564	145.6	341	118	189.0
Wage earners (average number).....	81,395	64,681	25.8	6,418	3,705	73.2	1,915	878	118.1
Primary horsepower.....	184,624	80,532	129.3	17,808	4,476	297.9	6,275	2,052	205.8
Capital.....	\$343,636,900	\$173,866,377	97.6	\$34,682,145	\$14,933,804	132.2	\$4,930,125	\$1,408,897	249.9
Expenses.....	1,160,119,929	668,368,248	73.6	143,730,165	81,252,201	76.9	13,516,784	3,911,700	245.5
Services.....	63,589,431	40,486,583	57.1	6,533,335	3,007,317	117.2	1,575,911	562,488	180.2
Salaries.....	17,849,895	9,452,733	88.8	1,868,417	648,914	187.9	335,645	109,068	207.7
Wages.....	45,739,536	31,033,850	47.4	4,664,918	2,358,403	97.8	1,240,266	453,420	173.5
Materials.....	1,059,236,121	605,223,221	75.0	132,201,955	76,873,618	72.0	11,389,708	3,213,260	254.5
Miscellaneous.....	37,294,377	22,658,444	64.6	4,994,875	1,371,266	264.3	551,165	135,952	305.4
Value of products.....	1,204,248,578	697,056,065	72.8	151,295,853	86,723,126	74.5	15,023,670	4,588,456	227.4
Value added by manufacture (value of products less cost of materials).....	145,012,457	91,832,844	57.9	19,093,898	9,849,508	93.9	3,633,962	1,375,196	164.2

¹ Comparable figures not available.

The slaughtering and meat packing branch of the industry so far overshadows the other branches that, although the percentages of increase from 1899 to 1909 were, on the whole, smaller, the actual amount of increase for this branch was much greater than for the other two branches combined.

Summary, by states.—Table 6 summarizes the more important statistics for the industry as a whole by states, the states being arranged according to the value of products reported for 1909. The states shown in this table are given their actual ranking among all states, the rank of certain states for which data can not be presented being higher than that of some named in the table. In considering the rank in value of products it should be borne in mind that there may be more duplication in value reported for some states than in that reported for others.

The slaughtering and meat packing industry is well distributed throughout the United States, establishments being reported in 1909 from 43 states and from the District of Columbia. Illinois is by far the most important state in the industry. It was surpassed in number of establishments, however, by New York, Pennsylvania, and Ohio, the establishments in Illinois being, in general, much larger than those in any other

state. The value of slaughtering and meat packing products in Illinois increased 35 per cent during the decade, but the relative importance of the state in the industry declined during this period, the proportion of the total value of products contributed by the state being 28.4 per cent in 1909, as compared with 34.5 per cent in 1904 and 36.6 per cent in 1899.

In value of products Kansas ranked second both in 1909 and 1904, New York third, Nebraska fourth, and Missouri fifth. In 1909 these five states reported 62.3 per cent of the total value of products in the industry, 60.3 per cent of the average number of wage earners, and 27.1 per cent of the establishments. Few changes took place during the five-year period in the ranking, as determined by value of products, of the more important states in the slaughtering and meat packing industry. Iowa, Ohio, and Texas advanced in rank, while Massachusetts, California, and Minnesota declined. The advances in the ranking of the more important states were due to the great increase in the meat-packing branch of the industry. In Iowa the wholesale slaughtering branch of the industry actually declined.

Of the 10 leading states, Ohio showed the most rapid increase in value of products during the period

from 1899 to 1909—144.6 per cent. Still higher percentages are shown, however, for some of the other states, notably Utah, New Jersey, West Virginia, Delaware, and Michigan. Georgia was the only state shown in Table 6 which reported a smaller value of products in 1909 than in 1899.

Table 6

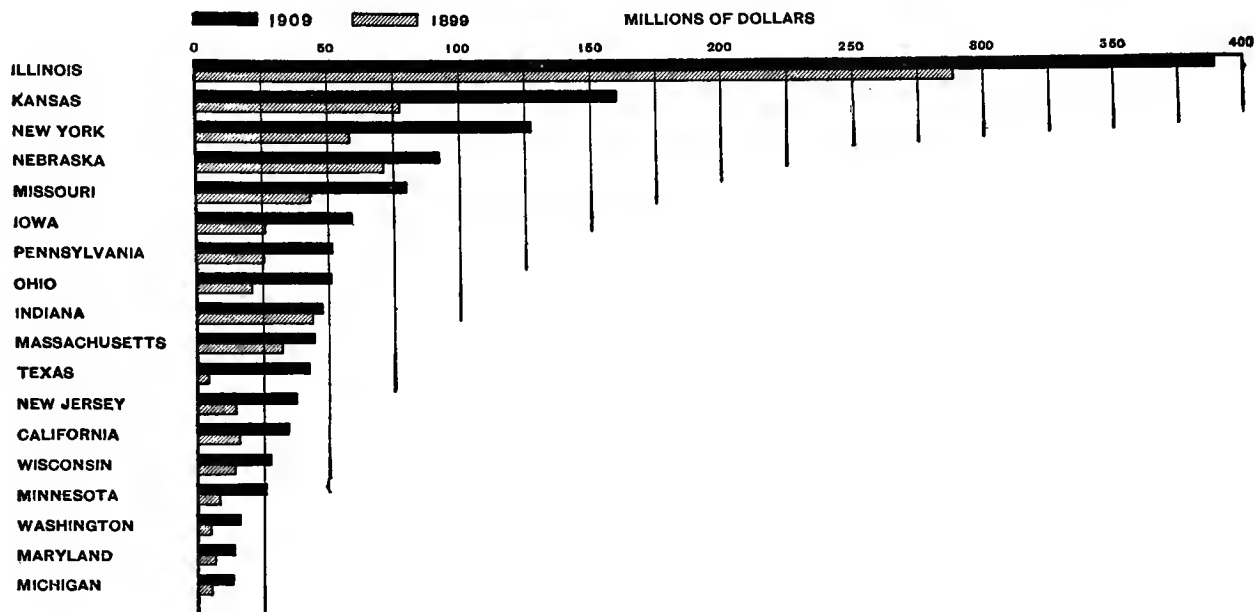
SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED.

STATE.	Number of establishments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹												
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.			
				1909	1904			1909	1904			1909	1904	1909	1904	1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States..	1,641	89,728	100.0			\$1,370,568,101	100.0			\$167,740,317	100.0			29.5	19.0	8.9	73.8	48.6	17.0	62.8	51.6	7.3	
Illinois.....	109	26,705	29.8	1	1	389,594,906	28.4	1	1	45,618,899	27.2	1	1	-4.6	-1.4	-3.1	35.0	22.4	10.2	10.0	21.3	-9.3	
Kansas.....	35	10,591	11.8	2	2	165,360,516	12.1	2	2	17,714,526	10.6	2	2	30.5			113.6			86.4			
New York.....	238	6,110	6.8	3	5	127,130,051	9.3	3	3	16,961,817	10.1	3	3	85.8	62.5	14.4	117.7	68.3	29.4	134.6	93.4	21.3	
Nebraska.....	18	6,015	6.7	4	3	92,305,484	6.7	4	4	13,947,606	8.3	4	4		7.6			33.1			73.2		
Missouri.....	45	4,674	5.2	5	4	79,581,294	5.8	5	5	7,383,030	4.4	5	5	49.6	10.3	35.6	84.4	32.4	39.3	85.5	22.8	51.0	
Iowa.....	33	4,144	4.6	7	7	59,045,232	4.4	6	8	5,917,856	3.5	8	11	42.9	33.5	7.0	129.2	95.8	17.0	42.3	103.5	-30.1	
Pennsylvania.....	180	3,050	3.4	11	9	51,850,936	3.8	7	7	7,005,889	4.2	6	6	77.0	20.6	46.7	103.0	56.6	29.6	87.8	47.2	27.6	
Ohio.....	158	3,086	3.4	10	10	50,804,100	3.7	8	10	6,456,938	3.8	7	8	73.0	33.3	29.8	144.6	74.3	40.4	133.9	68.0	39.2	
Indiana.....	61	4,423	4.9	6	6	47,289,469	3.5	9	9	5,303,495	3.2	11	10	22.7	40.2	-12.5	7.7	60.7	-32.9	0.8	66.4	-39.4	
Massachusetts.....	94	3,325	3.7	9	8	44,402,972	3.2	10	6	5,516,833	3.3	10	7	15.7	9.8	5.3	37.3	16.9	17.5	47.0	33.6	10.1	
Texas.....	14	3,639	4.1	8	11	42,529,746	3.1	11	15	5,119,961	3.1	12	14				164.4			207.4	128.3	34.6	
New Jersey.....	84	1,817	2.0	14	15	37,583,995	2.8	12	12	3,843,811	2.3	13	15	207.4	143.9	26.1	164.4	111.7	24.9	207.4	128.3	34.6	
California.....	94	1,641	1.8	15	14	34,280,003	2.5	13	11	5,831,946	3.5	9	9	74.8	27.5	37.1	116.7	55.7	39.2	165.0	78.8	48.2	
Wisconsin.....	48	1,890	2.1	13	12	27,216,864	2.0	14	14	3,813,426	2.3	14	12										
Minnesota.....	30	1,921	2.1	12	13	25,753,697	1.9	15	13	3,597,414	2.1	15	13		39.6			46.4			44.8		
Washington.....	14	828	0.9	18	20	15,653,998	1.1	16	17	1,894,016	1.1	17	18										
Maryland.....	54	1,034	1.2	16	16	13,682,951	1.0	17	16	2,180,335	1.3	16	17	122.4	84.0	20.9	114.1	99.8	7.2	229.8	127.1	45.2	
Michigan.....	45	902	1.0	17	17	13,435,114	1.0	18	18	1,769,289	1.1	18	20	92.3	80.8	6.4	148.7	111.4	17.7	204.0	143.7	24.7	
Colorado.....	13	659	0.7	19	21	9,656,810	0.7	19	20	1,362,031	0.8	19	21	152.5	166.8	-5.4	122.3	190.5	-23.5	119.0	151.3	-12.9	
Kentucky.....	37	354	0.4	22	18	6,568,077	0.5	20	19	822,219	0.5	21	16	-30.7	-25.0	-7.6	26.9	15.3	10.0	12.3	-25.2	50.1	
Oregon.....	14	366	0.4	21	21	5,879,615	0.4	21	23	864,769	0.5	20	22										
Virginia.....	24	342	0.4	23	23	4,600,630	0.3	22	25	543,477	0.3	23	26										
Connecticut.....	28	432	0.5	20	19	4,572,225	0.3	23	22	623,292	0.4	22	23	7.2	16.4	-7.9	19.2	42.1	-16.1	8.2	52.3	-29.0	
West Virginia.....	6	167	0.2	27	26	3,763,888	0.3	24	26	379,061	0.2	26	25				181.3			85.8			
Rhode Island.....	21	214	0.2	25	22	3,156,308	0.2	25	24	361,952	0.2	28	24		15.1			18.8			32.6		
Tennessee.....	27	280	0.3	24	28	2,056,719	0.2	26	28	446,609	0.3	24	29	68.7			20.2			92.7			
Montana.....	9	105	0.1	30	35	2,053,609	0.1	27	33	272,574	0.2	29	31				141.0			156.0			
District of Columbia.....	5	135	0.2	28	27	1,889,575	0.1	28	27	419,867	0.3	25	28										
Utah.....	12	99	0.1	31	32	1,690,446	0.1	29	31	363,652	0.2	27	30				273.1	158.8	44.2		161.2		
Delaware.....	9	82	0.1	33	30	1,371,853	0.1	30	29	140,687	0.1	33	32				150.4						
Maine.....	20	107	0.1	29	24	956,955	0.1	31	30	171,908	0.1	32	27										
Oklahoma.....	7	63	0.1	34	31	889,237	0.1	32	36	140,415	0.1	34	36						202.4				
Idaho.....	4	39	0.1	37	38	531,702	(2)	34	38	81,142	(2)	38	38						234.6				
Georgia.....	8	90	0.1	32	29	509,346	(2)	35	35	107,831	0.1	36	33				-13.9	58.6	-45.7	(2)	4.9	-4.7	
Florida.....	11	32	(2)	38	36	467,084	(2)	37	39	75,232	(2)	39	37										
Alabama.....	4	47	0.1	36	30	320,451	(2)	38	32	121,953	0.1	35	35										
Louisiana.....	10	182	0.2	26	25	276,454	(2)	39	21	178,249	0.1	30	19										
New Hampshire.....	8	24	(2)	39	39	199,221	(2)	40	42	34,709	(2)	41	42										
All other states.....	10	114	0.1			1,657,168	0.1			351,598	0.2												

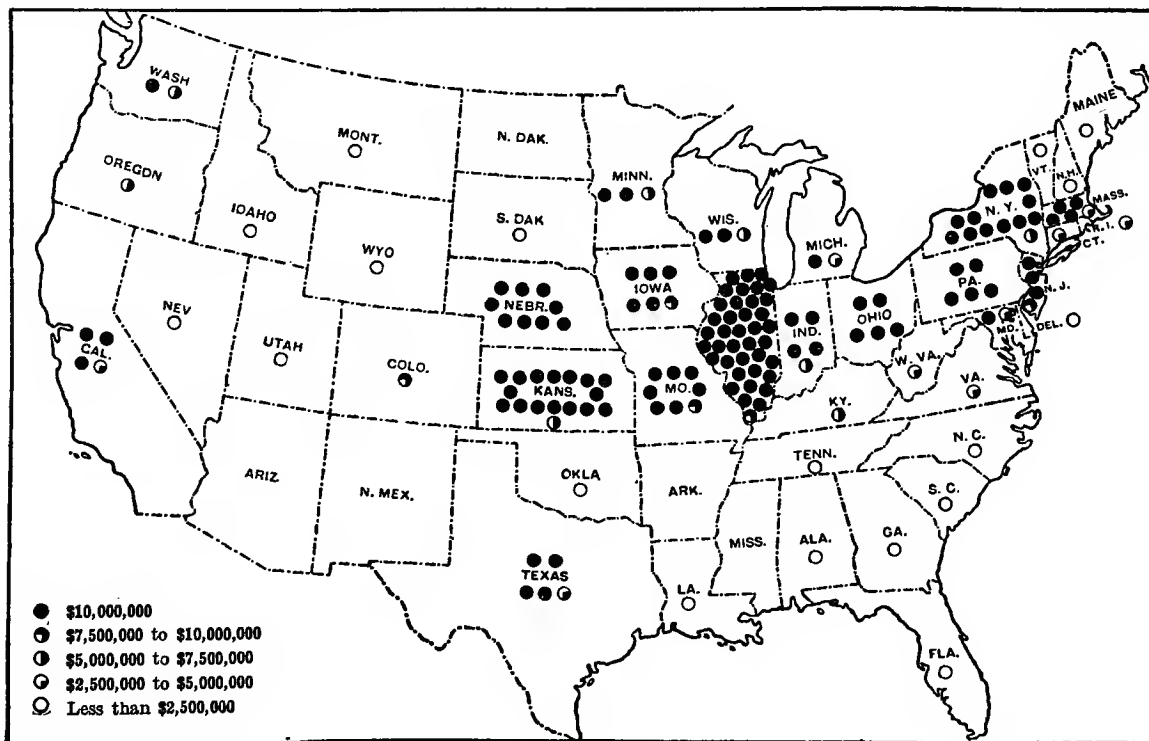
¹ Percentages are based on figures in Table 30. A minus sign (-) denotes decrease. Per cent not shown where base is less than 100 for wage earners or is less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.

² Less than one-tenth of 1 per cent.

THE SLAUGHTERING AND MEAT PACKING INDUSTRY—VALUE OF PRODUCTS FOR LEADING STATES: 1909 AND 1899.



THE SLAUGHTERING AND MEAT PACKING INDUSTRY—VALUE OF PRODUCTS, BY STATES: 1909.



PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 7 shows, for 1909, the number of persons engaged in the slaughtering and meat packing industry as a whole and in each of the three branches, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total	Male	Female
Slaughtering and meat packing—All branches combined	108,716	101,303	7,413
Proprietors and officials.....	3,514	3,460	54
Proprietors and firm members.....	1,659	1,624	35
Salaried officers of corporations.....	731	712	19
Superintendents and managers.....	1,124	1,124	.....
Clerks.....	15,474	13,794	1,680
Wage earners (average number).....	89,728	84,049	5,679
16 years of age and over.....	89,215	83,577	5,638
Under 16 years of age.....	513	472	41
Slaughtering and meat packing	97,476	90,423	7,053
Proprietors and officials.....	1,957	1,928	29
Proprietors and firm members.....	478	463	15
Salaried officers of corporations.....	576	562	14
Superintendents and managers.....	903	903	.....
Clerks.....	14,124	12,689	1,435
Wage earners (average number).....	81,395	75,806	5,589
16 years of age and over.....	80,911	75,363	5,548
Under 16 years of age.....	484	443	41
Slaughtering, not including meat packing	8,495	8,300	195
Proprietors and officials.....	938	979	9
Proprietors and firm members.....	692	688	4
Salaried officers of corporations.....	120	115	5
Superintendents and managers.....	176	176	.....
Clerks.....	1,089	925	164
Wage earners (average number).....	6,418	6,396	22
16 years of age and over.....	6,406	6,384	22
Under 16 years of age.....	12	12	.....
Sausage	2,745	2,580	165
Proprietors and officials.....	569	553	16
Proprietors and firm members.....	489	473	16
Salaried officers of corporations.....	35	35	.....
Superintendents and managers.....	45	45	.....
Clerks.....	261	180	81
Wage earners (average number).....	1,915	1,847	68
16 years of age and over.....	1,898	1,830	68
Under 16 years of age.....	17	17	.....

The average number of persons engaged in the industry as a whole during 1909 was 108,716, of whom 89,728, or 82.5 per cent, were wage earners; 3,514, or 3.2 per cent, proprietors and officials; and 15,474, or 14.2 per cent, clerks, this class including other subordinate salaried employees. The grouping of persons engaged according to occupational status differs widely in the different branches of the industry. In the slaughtering and meat packing branch 83.5 per

cent of the total were wage earners; 2 per cent, proprietors and officials; and 14.5 per cent, clerks. In the slaughtering branch 75.6 per cent were wage earners; 11.6 per cent, proprietors and officials; and 12.8 per cent, clerks; while of those engaged in sausage making only 69.8 per cent were wage earners and 9.5 per cent clerks, while 20.7 per cent were proprietors and officials.

Of the total number of persons engaged in the industry as a whole, 101,303, or 93.2 per cent, were males. Of the females, 76.6 per cent were wage earners, almost all of whom were in the meat packing branch of the industry, where they are employed in the packing and shipping of canned goods. Males constituted 99.7 per cent of the wage earners in the slaughtering branch, 96.4 per cent in sausage manufacture, and 93.1 per cent in meat packing.

The average number of wage earners in each state for 1909, 1904, and 1899 is given in Table 30. The average number distributed by sex and age is not shown for the individual states, but Table 31 gives, for 1909, such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904 it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 8.

CLASS.	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Proprietors and firm members.....	1,659	1.5	1,324	1.5	25.3
Salaried employees.....	17,329	15.9	12,096	13.6	43.3
Wage earners (average number).....	89,728	82.5	75,399	84.9	19.0

Table 9 shows the average number of wage earners in the industry as a whole distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. The table shows practically no change from census to census in the proportion of men employed, but the proportion of women has increased and that of children has decreased.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
16 years of age and over.....	89,215	99.4	74,419	98.7	67,595	97.6
Male.....	83,577	93.1	69,928	92.7	64,637	93.3
Female.....	5,638	6.3	4,491	6.0	2,958	4.3
Under 16 years of age.....	513	0.6	980	1.3	1,669	2.4

Wage earners employed, by months.—Table 10 gives the number of wage earners employed in the industry as a whole on the 15th (or the nearest representative day) of each month during the year 1909, for the 19 states in which more than 500 wage earners were employed during the year.

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	88,728	94,752	92,268	87,858	84,558	84,676	86,761	86,819	88,391	88,416	82,564	84,627	88,234
California.....	1,641	1,643	1,620	1,626	1,618	1,632	<i>1,586</i>	1,621	1,644	1,671	1,656	1,671	1,709
Colorado.....	659	680	673	663	650	660	692	671	653	<i>654</i>	635	634	669
Illinois.....	26,705	28,508	27,022	25,796	24,358	<i>24,293</i>	25,094	25,627	25,719	27,047	28,271	29,070	29,852
Indiana.....	4,423	4,752	4,638	4,488	4,120	<i>3,983</i>	4,295	4,312	4,236	4,349	4,441	4,578	4,884
Iowa.....	4,144	5,125	4,694	4,251	3,924	3,866	4,126	4,017	3,870	3,827	<i>3,763</i>	3,984	4,270
Kansas.....	10,591	10,748	10,264	<i>9,788</i>	9,949	10,220	10,430	10,426	10,382	10,839	11,465	11,471	11,110
Maryland.....	1,034	1,042	1,028	1,017	1,024	1,019	<i>990</i>	1,009	1,018	1,003	1,066	1,083	1,167
Massachusetts.....	3,325	3,562	3,513	3,442	3,269	<i>3,176</i>	3,248	3,314	3,276	3,351	3,225	3,257	3,281
Michigan.....	902	879	874	878	878	<i>864</i>	875	882	886	886	914	929	962
Minnesota.....	1,921	2,313	2,071	1,809	1,665	1,669	1,722	1,680	<i>1,623</i>	1,744	2,232	2,300	2,228
Missouri.....	4,674	4,788	4,963	4,831	4,374	<i>4,367</i>	4,512	4,464	4,577	4,766	4,853	4,844	4,797
Nebraska.....	6,015	5,936	6,784	5,786	<i>5,643</i>	5,740	6,051	5,855	5,769	5,978	6,146	6,157	6,314
New Jersey.....	1,817	2,068	2,007	1,956	1,829	1,772	1,766	1,657	<i>1,617</i>	1,672	1,776	1,834	1,857
New York.....	6,110	6,305	6,305	6,152	6,145	6,033	5,989	5,930	<i>5,893</i>	5,950	6,082	6,229	6,313
Ohio.....	3,086	3,116	3,052	3,004	<i>2,993</i>	3,013	3,069	3,030	3,012	3,146	3,175	3,203	3,219
Pennsylvania.....	3,050	3,142	3,103	3,061	3,008	2,997	3,006	2,973	<i>2,940</i>	2,986	3,071	3,129	3,184
Texas.....	3,639	<i>3,462</i>	3,618	3,608	3,627	3,856	3,564	3,477	3,543	3,756	3,677	3,661	3,823
Washington.....	828	<i>772</i>	775	778	819	827	858	862	827	822	833	808	856
Wisconsin.....	1,890	2,600	2,050	1,939	1,722	1,720	1,890	1,787	1,705	<i>1,618</i>	1,732	1,853	2,065

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The totals for the industry as a whole show that there was little seasonal variation in employment. The largest number of wage earners reported for any month in 1909 was 96,234 for December, and the smallest number 84,558 for April, the minimum number being equal to 87.9 per cent of the maximum. In 1904 the maximum number, 85,620, was shown for December, and the minimum number, 61,303, for July, the latter number being equal to 71.6 per cent of the former. In no state of importance in the industry do great fluctuations in employment appear. The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for a larger number of states in Table 31.

Prevailing hours of labor.—In Table 11 the wage earners in the industry as a whole have been classified according to the hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Nearly three-fourths (72.2 per cent) of the wage earners employed in the industry as a whole in 1909 worked in establishments where the prevailing number of hours of labor was 60 per week. Only 5.5 per cent were employed in establishments where the usual hours were 48 and under. In all the states for which separate figures are shown 60 hours per week constituted the most common time of employment.

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	88,728	4,903	4,138	10,504	4,275	64,776	638	494
California.....	1,641	55	37	455	1,029	47	18	
Colorado.....	659			287	372			
Illinois.....	26,705	2,900	45	1,143	57	22,557	3	
Indiana.....	4,423	28		22	4,373			
Iowa.....	4,144	324		922	60	2,836		2
Kansas.....	10,591	371	2,941	834		6,442		3
Maryland.....	1,034	22	4	21	7	973	1	6
Massachusetts.....	3,325	59	35	70	1,337	1,819	4	1
Michigan.....	902	14		35	3	849	1	
Minnesota.....	1,921	1	13	22	2	1,881	2	
Missouri.....	4,674	4		1,960	59	2,650		1
Nebraska.....	6,015			734	1,484	3,786	2	9
New Jersey.....	1,817	116	261	44	136	1,090	16	154
New York.....	6,110	549	326	718	450	3,995	50	22
Ohio.....	3,086	26	6	484	90	2,333	67	80
Pennsylvania.....	3,050	63	125	44	271	2,331	160	56
Texas.....	3,639	9		1,631		1,949		50
Washington.....	828	16		31		776	5	
Wisconsin.....	1,890	135		734		1,021		

CHARACTER OF OWNERSHIP.

Table 12 presents statistics with respect to the character of ownership of establishments of the slaughtering and meat packing industry as a whole.

In 1909, of the total number of establishments, 29.7 per cent were under corporate ownership, as compared with 24.4 per cent in 1904. While corporations thus controlled approximately three-tenths of the total number of establishments in 1909, the value of the products of these establishments represented nearly nine-tenths of the total for the industry.

Table 12

CHARACTER OF OWNERSHIP.	SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	1,641	1,221	\$1,370,563,101	\$922,037,528
Individual	786	633	75,683,555	53,089,323
Firm ¹	367	285	79,456,531	69,976,859
Corporation	488	298	1,215,423,015	793,971,346
Per cent of total	100.0	100.0	100.0	100.0
Individual	47.9	52.3	5.5	6.3
Firm ¹	22.4	23.3	5.8	7.6
Corporation	29.7	24.4	88.7	86.1

¹ Includes 3 establishments under "other" ownership in 1909 and 1 in 1904, to avoid disclosure of individual operations.

Table 13 gives statistics for establishments classified according to form of ownership for the 19 states in which an average of 500 or more wage earners were employed during the year. The three establishments under unclassified forms of ownership have

in this table been included with those under firm ownership.

In 1909, 4,906 wage earners, or 5.5 per cent of the total, were employed in establishments under individual ownership; 4,483, or 5 per cent, in those under firm ownership (including those under "other" ownership); and 80,339, or 89.5 per cent, in those under corporate ownership. Considerable variation existed among the different states in the relative importance of establishments under the different forms of ownership. In Illinois, for example, establishments controlled by corporations constituted 49.5 per cent of the total number, gave employment to 96.1 per cent of the wage earners, and reported 96.2 per cent of the value of products. In Maryland, on the other hand, corporations controlled only 14.8 per cent of the establishments, and these establishments gave employment to 57.2 per cent of the wage earners and contributed 53.2 per cent of the value of products.

Table 13

STATE.	SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED: 1909											
	Number of establishments owned by—			Wage earners in establishments owned by—			Value of product of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	786	367	488	4,908	4,483	80,339	\$75,683,555	\$79,456,531	\$1,215,423,015	\$9,998,838	\$9,080,765	\$143,859,814
California.....	33	34	27	155	171	1,315	4,276,592	4,444,852	25,558,559	611,509	546,152	4,674,285
Colorado.....	1	2	10	.....	4	655	(X)	59,276	9,597,534	(X)	24,966	1,337,665
Illinois.....	36	19	54	688	350	25,667	9,344,597	4,982,255	374,768,054	857,279	742,958	44,018,662
Indiana.....	22	18	21	142	123	4,158	1,647,241	2,085,684	43,556,544	257,753	295,120	4,750,622
Iowa.....	12	7	14	94	1,107	2,943	931,307	11,135,090	46,978,835	133,513	865,977	4,918,366
Kansas.....	12	5	18	64	15	10,512	608,127	311,802	164,440,587	104,867	60,652	17,549,007
Maryland.....	36	10	8	319	124	591	4,740,752	1,660,429	7,281,770	935,885	205,330	1,039,120
Massachusetts.....	57	14	23	238	117	2,970	1,948,761	1,904,899	40,549,312	492,049	244,628	4,780,156
Michigan.....	26	12	7	103	72	727	1,199,986	1,171,597	11,063,531	242,016	198,940	1,328,333
Minnesota.....	12	7	11	37	60	1,824	431,363	641,363	24,680,830	80,339	115,859	3,401,216
Missouri.....	15	8	22	35	35	4,604	543,268	811,011	78,222,015	87,877	110,365	7,184,788
Nebraska.....	7	6	5	19	19	5,977	353,003	297,364	91,655,117	66,618	53,020	13,827,988
New Jersey.....	41	20	23	183	252	1,382	5,236,637	6,500,346	25,846,412	439,734	527,049	2,876,128
New York.....	146	50	42	949	937	4,224	17,134,693	25,164,429	84,830,929	2,191,463	2,510,493	12,259,861
Ohio.....	80	31	47	463	148	2,475	7,690,049	4,044,496	39,069,555	968,940	416,638	5,071,360
Pennsylvania.....	92	44	44	693	388	1,969	9,406,946	6,985,578	35,458,412	1,079,096	979,826	4,946,967
Texas.....	1	.....	13	(X)	.....	3,639	(X)	.....	42,529,746	(X)	.....	6,119,961
Washington.....	2	1	11	(X)	(X)	828	(X)	(X)	15,653,998	(X)	(X)	1,824,016
Wisconsin.....	24	14	10	122	92	1,676	1,260,368	897,587	25,058,909	254,723	185,202	3,373,504

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for establishments under firm ownership include those for the three comparatively unimportant establishments operated by cooperative associations or under other miscellaneous forms of ownership.

SIZE OF ESTABLISHMENTS.

Classification by value of products.—Table 14 presents statistics for 1909 and 1904 for establishments in the industry as a whole, grouped according to the value of their products.

In 1909, 10.1 per cent of the establishments manufactured products valued at \$1,000,000 or over, as against 9 per cent in 1904. While such establishments represented a comparatively small proportion of the total number at both censuses, they reported 85.8 per cent of the total value of products in 1909 and 83.9 per cent in 1904.

The average value of products per establishment increased from \$755,149 in 1904 to \$835,203 in 1909, and the average value added by manufacture, as computed from the figures in Table 3, from \$90,591 to \$102,218. The average number of wage earners

per establishment, however, decreased from 62 in 1904 to 55 in 1909.

Table 14

VALUE OF PRODUCTS PER ESTABLISHMENT.	SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	1,641	1,221	\$1,370,563,101	\$922,037,528
Less than \$5,000.....	108	84	297,915	222,201
\$5,000 and less than \$20,000.....	295	240	3,517,149	2,766,154
\$20,000 and less than \$100,000.....	575	391	28,261,726	18,361,018
\$100,000 and less than \$1,000,000.....	497	1,383	162,029,898	124,312,963
\$1,000,000 and over.....	166	110	1,176,461,413	1,773,222,035
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	6.6	6.9	(²)	(²)
\$5,000 and less than \$20,000.....	18.0	19.7	0.2	0.3
\$20,000 and less than \$100,000.....	35.0	32.0	2.1	2.0
\$100,000 and less than \$1,000,000.....	30.3	131.4	11.8	13.5
\$1,000,000 and over.....	10.1	9.0	85.8	83.9

¹ Figures for establishments manufacturing sausage have been omitted from this group to avoid disclosure of individual operations, but have been included in the total.
² Less than one-tenth of 1 per cent.

Classification by number of wage earners.—Table 15 states according to the number of wage earners employed.

Table 15 SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED: 1909

STATE.	Establishments employing—																		
	Total.		No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.	1,641	89,728	86	830	2,027	376	4,069	160	5,163	87	6,241	40	6,569	22	7,342	17	12,895	23	46,422
California.....	94	1,641	5	51	128	25	277	6	157	4	306	1	111	2	662				
Colorado.....	13	659	2	3	10	3	40	1	23	2	120	1	184	1	282				
Illinois.....	109	26,705	5	32	90	22	265	21	724	12	891	5	954	1	254	2	1,617	9	21,910
Indiana.....	61	4,423		29	80	18	215	6	191	4	276	2	273	1	335			1	3,053
Iowa.....	33	4,144		12	21	9	101	1	36	5	359	2	318			3	2,234	1	1,075
Kansas.....	35	10,591	1	10	37	3	21	5	198			2	297	1	365	3	2,406	4	7,267
Maryland.....	54	1,034	1	31	72	11	113	4	141	6	470	1	238			1	912	1	1,015
Massachusetts.....	94	3,325	2	52	132	30	274	3	83	2	145	1	196	2	568				
Michigan.....	45	902	5	26	53	6	56	6	149			2	347	1	297				
Minnesota.....	30	1,921	2	16	52	4	45	5	165	1	59			1	303			1	1,297
Missouri.....	45	4,674	5	17	38	10	128	5	176	2	125	1	134	2	996	2	1,416	1	1,663
Nebraska.....	18	6,015	1	10	25	2	13		1	180			1	238	1	734	3	5,063	
New Jersey.....	84	1,817	1	43	119	28	322	3	106	6	436	2	442	1	392				
New York.....	238	6,110	15	129	310	49	548	25	770	9	607	5	808	4	1,361	2	1,708		
Ohio.....	158	3,086	12	80	204	36	400	14	474	13	961	1	122	1	347				
Pennsylvania.....	180	3,050	15	88	222	41	443	20	585	10	678	5	766	1	356				
Texas.....	14	3,639		3	5	3	26	3	96	1	78	2	355					2	3,079
Washington.....	14	828		4	7	5	69	1	40	1	61	2	392	1	269				
Wisconsin.....	48	1,890	2	30	67	4	37	6	197	3	187	1	110			2	1,292		

Of the 1,641 establishments reported in 1909, 5.2 per cent employed no wage earners; 50.6 per cent employed from 1 to 5; 22.9 per cent, from 6 to 20; 15.1 per cent, from 20 to 100; 3.8 per cent, from 101 to 500; and 2.4 per cent, over 500. Although almost three-fourths of the establishments employed 20 wage earners or less, only 6.8 per cent of the total number of wage earners were reported from such establishments; those establishments employing 21 to 100 wage earners reported 12.7 per cent of the total; those employing 101 to 500, 15.5 per cent; and those employing more than 500, 65 per cent. The 23 establishments employing over 1,000 wage earners each reported 50.6 per cent of the total for the industry.

EXPENSES.

As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$1,317,366,878, distributed as follows: Cost of materials, \$1,202,827,784, or 91.3 per cent; wages, \$51,644,720, or 3.9 per cent; salaries, \$20,053,957, or 1.5 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machin-

ery, insurance, traveling expenses, and other sundry expenses, \$42,840,417, or 3.3 per cent. The percentages of total expenses represented by the several classes of expense are shown for each of the three branches of the industry in Table 16.

Table 16 PER CENT OF TOTAL EXPENSES REPORTED: 1909

BRANCH.	PER CENT OF TOTAL EXPENSES REPORTED: 1909			
	Materials.	Salaries.	Wages.	Miscellaneous.
The industry as a whole.....	91.3	1.5	3.9	3.3
Slaughtering and meat packing.....	91.3	1.5	3.9	3.3
Slaughtering, not including meat packing.....	92.0	1.3	3.2	3.5
Sausage.....	84.3	2.5	9.2	4.1

The cost of materials constituted the principal item of expense in the slaughtering and meat packing industry, forming a very large proportion of the total in each of the three branches of the industry. Marked variations are shown in the proportions represented by the different classes of expense in the various states. (See Table 31.) Among 21 principal states, the proportion of the total expenses represented by salaries ranged from 1 per cent in Kentucky, to 2.3 per cent in Colorado; that represented by wages from 3.4 per cent in Missouri to 5 per cent in Oregon; that represented by cost of materials from 89 per cent in Oregon to 93 per cent in Kentucky; and that represented by miscellaneous expenses from 2 per cent in Kentucky to 4.5 per cent in Nebraska.

ENGINES, POWER, AND FUEL.

Engines and power.—Table 17 shows, for the slaughtering and meat packing industry as a whole, statistics of power as reported at the censuses of 1909, 1904, and 1899.

POWER.	SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	3,275	1,388	1,369	208,707	119,311	87,060	100.0	100.0	100.0
Owued.....	1,862	1,388	1,369	192,920	115,601	85,817	92.4	97.0	98.6
Steam.....	1,743	1,324	1,325	190,636	113,479	85,149	91.3	95.1	97.8
Gas.....	113	53	41	2,208	740	560	1.1	0.6	0.6
Water wheels.....	2	6	3	30	298	13	(¹)	0.3	(¹)
Water motors.....	4	5	(²)	16	13	(²)	(¹)	(²)	.....
Other.....	.....	.....	.....	30	1,161	95	(¹)	1.0	0.1
Rented.....	1,413	(²)	(²)	15,787	3,620	1,243	7.6	3.0	1.4
Electric.....	1,413	(²)	(²)	15,047	3,441	1,127	7.2	2.9	1.3
Other.....	.....	.....	.....	740	179	116	0.4	0.1	0.1
Electric motors.	5,824	2,090	574	73,677	40,538	11,304	100.0	100.0	100.0
Run by current generated by establishment.....	4,411	2,090	574	63,630	37,097	10,177	80.9	91.5	90.0
Run by rented power.....	1,413	(²)	(²)	15,047	3,441	1,127	19.1	8.5	10.0

¹ Less than one-tenth of 1 per cent.² Not reported.

The total primary power used in the industry increased from 87,060 horsepower in 1899 to 208,707 horsepower in 1909, or 139.7 per cent. At each of the last three censuses steam engines produced over nine-tenths of the total primary power, but notwithstanding the increase of 105,487, or 123.9 per cent, in steam power during the decade, this power formed a smaller proportion of the total in 1909 than in 1899. The amount of rented electric power, on the other hand, was more than thirteen times as great in 1909 as in 1899, the proportion which it formed of the total advancing from 1.3 per cent to 7.2 per cent during the decade. The number and horsepower of electric motors used for distributing power by means of current generated in the same establishment also show a very great increase.

Table 18 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in 19 of the leading states.

In 1909 seven states—Illinois, Kansas, New York, Pennsylvania, Nebraska, Missouri, and Texas—together reported 142,224 horsepower, or 68.1 per cent of the aggregate for the industry. In every state shown in the table, except Washington, where rented electric power represented 61.4 per cent of the total, steam power was the most important kind of primary power.

Table 18

SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED: 1909

STATE.	SLAUGHTERING AND MEAT PACKING—ALL BRANCHES COMBINED: 1909																
	Primary horsepower.							Electric horsepower.		Fuel used.							
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.					
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
United States..	1,182	208,707	192,920	190,636	2,208	48	30	15,047	740	78,677	63,630	193,935	2,512,864	976	37,603	1,102,550	1,091,164
California.....	67	3,867	2,492	2,441	51	.....	.....	1,375	.....	1,606	231	108	294	32	1,501	153,290	990
Colorado.....	12	2,450	2,337	2,337	.....	.....	.....	113	.....	795	682	.....	41,871	.....	40	.....	.....
Illinois.....	98	56,651	53,221	53,075	116	30	.....	3,430	.....	26,296	22,866	3,609	957,979	600	4,093	1,929	128,503
Indiana.....	49	5,973	5,786	5,648	138	.....	.....	145	42	2,472	2,327	.....	151,800	.....	1,852	3	3,602
Iowa.....	29	8,309	7,881	7,718	163	.....	.....	428	.....	3,275	2,847	21	167,903	.....	1,198	205	812
Kansas.....	15	24,560	24,420	24,405	15	.....	.....	140	.....	10,758	10,618	.....	203,730	.....	631	517,451	395,895
Maryland.....	40	3,024	2,882	2,872	10	.....	.....	142	.....	1,030	888	30	40,765	.....	1,225	14	1,014
Massachusetts.....	66	4,844	3,411	3,350	61	.....	.....	1,399	34	1,554	155	34,007	12,584	103	2,320	13	1,583
Michigan.....	37	3,404	2,924	2,895	29	.....	.....	480	.....	911	431	45	19,644	.....	1,283	36	281
Minnesota.....	26	4,579	4,058	.....	.....	.....	.....	521	.....	1,023	502	980	68,005	.....	682	.....	.....
Missouri.....	33	11,735	11,639	11,585	54	.....	.....	96	.....	5,004	4,908	2,533	187,072	.....	1,440	6,586	365,239
Nebraska.....	11	11,873	11,851	11,821	30	.....	.....	22	.....	3,930	3,908	.....	242,154	.....	7	1,386	126
New Jersey.....	63	3,610	3,149	2,999	150	.....	.....	303	158	894	591	54,468	2,395	.....	1,031	294	4,606
New York.....	170	13,936	11,458	11,168	290	.....	.....	2,328	150	3,865	1,537	71,124	83,556	152	1,328	566	13,473
Ohio.....	97	9,873	9,274	8,910	364	.....	.....	599	.....	2,458	1,857	.....	87,452	4	1,424	524	118,502
Pennsylvania.....	113	12,139	11,678	11,450	228	.....	.....	461	.....	3,098	2,637	25,795	68,697	.....	3,396	265	35,744
Texas.....	12	11,390	11,291	11,201	.....	.....	.....	39	.....	4,177	4,138	.....	21,639	.....	360	383,902	.....
Washington.....	12	1,883	726	.....	.....	.....	.....	1,157	.....	1,160	3	.....	11,605	.....	8,788	50	12
Wisconsin.....	36	3,283	3,120	3,043	74	3	.....	163	.....	1,474	1,311	751	45,681	.....	674	60	636
All other states.....	196	11,384	9,322	8,844	435	13	30	1,706	356	2,899	1,193	464	97,838	85	4,332	35,986	20,096

Fuel consumed.—Bituminous coal was the principal fuel used, 2,512,864 short tons being consumed during 1909. In Massachusetts and New Jersey, however,

much larger quantities of anthracite than of bituminous coal were consumed. In several of the states considerable quantities of gas were used.

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

MATERIALS.

Summary for the United States.—Table 19 shows statistics of materials used in the industry as a whole for 1909, 1904, and 1899.

MATERIAL.	1909	1904	1899	Per cent of increase: 1899-1909
Total cost.....	\$1,202,827,784	\$811,425,562	\$685,310,099	75.6
Animals slaughtered.....	\$960,725,581	\$675,893,676	\$570,183,432	68.5
Beeves—				
Number.....	8,114,860	7,147,835	5,525,824	46.9
Cost.....	\$392,127,010	\$289,040,930	\$247,146,262	58.7
Calves—				
Number.....	2,504,728	1,568,130	883,857	183.4
Cost.....	\$25,030,014	\$12,665,557	\$7,252,545	245.1
Sheep and lambs—				
Number.....	12,255,501	10,875,339	9,110,172	34.5
Cost.....	\$59,924,931	\$44,359,804	\$36,859,832	62.6
Hogs—				
Number.....	33,870,616	30,977,639	30,595,522	10.7
Cost.....	\$483,383,848	\$329,765,480	\$278,370,494	73.6
Goats and kids—				
Number.....	33,224	(²)	(²)	.....
Cost.....	\$121,230	(²)	(²)	.....
All other animals.....	\$138,548	\$61,905	\$554,299	-75.0
Dressed meat, purchased..	\$93,409,286	\$53,114,957	\$54,247,986	72.2
All other materials.....	\$148,692,917	\$82,416,929	\$60,878,681	144.2

¹ A minus sign (—) denotes decrease.

² Figures not available.

In the slaughtering and meat packing industry the cost of materials forms a larger proportion (91.3 per cent) of the total expenses than in most other industries, owing to the fact that the processes of manufacture are comparatively simple and inexpensive.

No statistics were secured concerning the quantity of meat or other materials used by establishments engaged in the manufacture of sausage, and the cost of materials for this branch of the industry is included in the amount shown for "all other materials" in Table 19. This item for the industry as a whole, amounting to \$148,692,917 in 1909, includes also the cost of containers, or of materials used in their manufacture, of cottonseed oil for the manufacture of lard compounds and lard substitutes, of materials for ice making and refrigeration, and cost of fuel and rent of power.

The total cost of all materials increased \$517,517,685, or 75.5 per cent, from 1899 to 1909. Exclusive of goats and kids, for which there are no available figures for 1904 or 1899, and of "all other animals," for which the cost only was returned, 56,745,705 animals were slaughtered by establishments in the industry in 1909, as compared with 46,115,375 in 1899, an increase of 10,630,330, or 23.1 per cent. The total cost of all animals slaughtered, including goats and kids and "all other animals," was \$960,725,581 in 1909 as compared with \$570,183,432 in 1899, an increase of \$390,542,149, or 68.5 per cent.

The increase from 1899 to 1909 in the number of beeves slaughtered was 2,589,036, or 46.9 per cent; in number of calves, 1,620,871, or 183.4 per cent; of sheep and lambs, 3,145,329, or 34.5 per cent; and of

hogs, 3,275,094, or 10.7 per cent. The increase in cost of beeves on the hoof for the same period was \$144,980,748, or 58.7 per cent; of calves, \$17,777,469, or 245.1 per cent; of sheep and lambs, \$23,065,099, or 62.6 per cent; and of hogs, \$205,013,354, or 73.6 per cent. Thus hogs showed the greatest absolute, and calves the greatest relative, increase both in number and in cost during the 10 years.

In the cost of "all other" animals slaughtered is included a large expenditure for poultry, many of the establishments doing an extensive business in this line.

"Dressed meat, purchased" includes not only meat for curing, but also fats for the rendering of lard, and shows the very material increase of \$39,161,300, or 72.2 per cent, from 1899 to 1909.

The gross and net weight in pounds, on the hoof and dressed, with averages per head, of the principal kinds of animals slaughtered in 1909, 1904, and 1899, are shown in Table 20. The dressed weight is exclusive of edible offal.

	1909	1904	1899
BEEVES.			
Number.....	8,114,860	7,147,835	5,525,824
Weight on hoof, pounds.....	8,265,991,836	7,485,407,944	5,908,165,706
Average weight on hoof, pounds..	1,019	1,047	1,069
Weight, dressed, pounds.....	4,409,718,922	4,066,264,877	3,222,733,617
Average weight, dressed, pounds..	543	569	583
CALVES.			
Number.....	2,504,728	1,568,130	883,857
Weight on hoof, pounds.....	419,604,080	261,683,572	124,354,340
Average weight on hoof, pounds..	168	167	141
Weight, dressed, pounds.....	262,315,076	161,049,581	79,498,483
Average weight, dressed, pounds..	105	103	90
SHEEP AND LAMBS.			
Number.....	12,255,501	10,875,339	9,110,172
Weight on hoof, pounds.....	987,566,521	930,168,367	764,269,802
Average weight on hoof, pounds..	81	86	84
Weight, dressed, pounds.....	496,640,869	464,872,621	389,132,646
Average weight, dressed, pounds..	41	43	43
HOGS.			
Number.....	33,870,616	30,977,639	30,595,522
Weight on hoof, pounds.....	6,856,832,417	6,586,349,782	6,676,709,331
Average weight on hoof, pounds..	202	213	218
Weight, dressed, pounds.....	5,201,902,778	5,048,832,850	5,203,280,487
Average weight, dressed, pounds..	154	163	170

Table 20 shows a decrease for the 10-year period 1899-1909 in the average dressed weight of beeves, hogs, sheep, and lambs. The average weight of calves increased.

Total number of animals slaughtered for food.—The number of animals killed in wholesale slaughtering and meat packing establishments obviously represents only a portion of the total number of animals slaughtered for food. In order to secure this total, as required by a special amendment to the act providing for the Thirteenth Census, the enumerators obtained reports from retail slaughterhouses, and to these figures were added the statistics regarding the number of animals slaughtered on farms and ranges, secured through the census of agriculture. Table 21 shows the total number of animals reported as slaughtered for food in 1909.

Table 21

KIND.	ALL ANIMALS SLAUGHTERED FOR FOOD: 1909			
	Total.	In slaughtering and meat packing establishments.	In retail slaughter-houses.	On farms. ¹
	NUMBER.			
Total.....	88,358,815	56,778,929	13,012,614	18,567,272
Beeves.....	13,611,422	8,114,860	4,087,922	1,408,640
Calves.....	6,515,976	2,504,728	2,879,648	1,131,600
Sheep and lambs.....	14,724,699	12,255,501	1,939,672	529,528
Hogs.....	53,219,568	33,870,616	3,970,435	15,378,517
Goats and kids.....	285,553	33,224	133,340	118,989
All other animals.....	1,597	.....	1,597	.....
PER CENT OF TOTAL.				
Total.....	100.0	84.3	14.7	21.0
Beeves.....	100.0	59.6	30.0	10.3
Calves.....	100.0	38.4	44.2	17.4
Sheep and lambs.....	100.0	83.2	13.2	3.6
Hogs.....	100.0	63.6	7.5	28.9
Goats and kids.....	100.0	11.6	48.7	41.7
All other animals.....	100.0	.....	100.0	.....

¹ The inquiry concerning the animals slaughtered on farms called for the number of "sheep" and "goats" without expressly stating that lambs and kids were to be included. It is possible, therefore, that the number of sheep reported may not include all the lambs, or the number of goats include all the kids. The omissions, if any, were presumably few.

The total number of animals slaughtered for food in the United States in 1909 was 88,358,815. Of this number, the hogs slaughtered represented 60.2 per

cent; sheep and lambs, 16.7 per cent; beeves, 15.4 per cent; calves, 7.4 per cent; and goats and kids, three-tenths of 1 per cent.

The bulk of the slaughtering in 1909 was done by wholesale establishments, almost two-thirds of the animals being killed in such plants. The larger number of calves, however, were slaughtered by retail establishments. It is notable that a larger number of hogs than of other animals were slaughtered on farms and ranges. Such animals can be slaughtered in the open with very little preparation and very few implements, and the edible offal is easily handled. It should also be borne in mind that a great many farmers have their own smokehouses and make a practice of curing the pork produced on their farms. The number of hogs slaughtered on farms and ranges represented 82.8 per cent of all animals slaughtered on farms and 28.9 per cent of the total number of hogs slaughtered in the United States.

Animals slaughtered, by states.—Table 22 shows by states the number and cost of each of the several kinds of animals slaughtered in 1909, and the number only of the animals slaughtered in 1904 and 1899. The states included are those in which were slaughtered during 1909 at least 100,000 beeves, 50,000 calves, 100,000 sheep and lambs, and 200,000 hogs.

Table 22

CLASS AND STATE.	ANIMALS SLAUGHTERED.				CLASS AND STATE.	ANIMALS SLAUGHTERED.			
	1909		1904	1899		1909		1904	1899
	Cost.	Number.	Number.	Number.		Cost.	Number.	Number.	Number.
Beeves, total.....	\$392,127,010	8,114,860	7,147,835	5,525,824	Sheep and lambs, total.....	\$59,924,931	12,255,501	10,875,339	9,110,172
California.....	14,348,274	341,617	259,716	174,113	California.....	4,436,865	1,071,998	990,514	695,058
Illinois.....	109,990,873	2,181,199	2,643,028	2,057,059	Illinois.....	19,429,169	3,892,142	3,634,216	3,139,160
Indiana.....	10,702,274	252,897	178,678	358,585	Kansas.....	5,186,825	1,136,027	771,818	636,832
Iowa.....	11,259,445	252,821	91,564	77,846	Massachusetts.....	1,730,127	342,491	418,580	407,466
Kansas.....	63,452,976	1,362,572	1,019,583	927,339	Minnesota.....	5,992,993	133,244	180,695	93,717
Minnesota.....	4,195,238	125,852	108,829	52,700	Missouri.....	2,659,215	548,640	564,784	252,015
Missouri.....	24,332,919	530,356	573,887	346,827	Nebraska.....	5,429,148	1,127,962	949,310	723,520
Nebraska.....	32,069,207	651,288	627,129	531,032	New Jersey.....	2,283,693	423,724	502,642	380,406
New York.....	47,746,152	668,447	478,716	378,833	New York.....	10,437,800	1,918,721	1,537,637	1,487,157
Ohio.....	11,613,314	265,191	189,613	98,636	Ohio.....	872,989	229,985	148,418	70,739
Pennsylvania.....	14,997,080	252,897	197,581	130,073	Pennsylvania.....	2,332,533	445,471	363,494	231,556
Texas.....	15,089,886	527,469	285,295	24,375	Washington.....	1,394,189	290,383	179,319	132,756
Washington.....	5,851,681	117,522	54,539	39,869	All other states.....	3,139,385	696,704	633,412	859,790
All other states.....	26,480,691	584,962	439,707	328,537	Hogs, total.....	483,383,848	33,870,616	30,977,639	30,585,522
Calves, total.....	25,030,014	2,504,728	1,568,130	883,857	California.....	4,339,254	344,319	314,085	228,675
California.....	930,781	81,344	45,100	28,531	Colorado.....	4,056,945	276,618	108,741	160,210
Illinois.....	4,720,290	513,639	295,928	149,450	Illinois.....	107,716,321	7,293,544	7,854,370	8,291,706
Indiana.....	615,667	60,578	37,566	12,943	Indiana.....	25,277,218	1,751,454	1,498,767	1,850,370
Kansas.....	2,202,653	209,357	92,751	36,720	Iowa.....	38,499,019	2,487,251	2,070,473	1,922,698
Massachusetts.....	854,275	129,162	88,651	73,288	Kansas.....	57,042,948	4,191,927	3,089,611	2,849,648
Minnesota.....	431,438	55,991	21,823	0,219	Kentucky.....	3,564,206	236,428	377,280	502,856
Missouri.....	821,629	81,551	52,044	22,825	Maryland.....	5,808,872	554,701	631,746	607,435
Nebraska.....	637,158	58,158	9,707	8,454	Massachusetts.....	25,048,740	1,501,466	1,549,365	1,876,245
New Jersey.....	1,145,785	95,604	103,389	63,037	Michigan.....	6,734,073	444,760	288,603	341,815
New York.....	4,406,891	377,121	238,751	207,016	Minnesota.....	13,444,413	1,063,655	1,047,094	422,325
Ohio.....	1,599,585	150,223	86,906	31,971	Missouri.....	36,911,941	2,471,658	2,126,932	1,857,953
Pennsylvania.....	1,764,473	152,851	112,867	51,510	Nebraska.....	32,535,715	2,103,602	2,355,325	2,733,304
Texas.....	2,074,188	234,172	94,093	7,544	New Jersey.....	11,694,440	1,210,849	1,282,410	931,694
Wisconsin.....	1,045,962	123,207	34,507	21,973	New York.....	23,802,670	1,802,669	1,623,758	1,701,096
All other states.....	1,776,539	175,770	201,047	92,376	Ohio.....	24,547,970	1,725,286	1,447,773	1,288,597
					Pennsylvania.....	16,934,874	1,222,880	1,085,634	831,821
					Texas.....	10,933,088	939,674	347,040	208,270
					Washington.....	4,107,508	239,352	122,313	72,149
					Wisconsin.....	15,704,705	1,078,361	938,418	947,614
					All other states.....	14,683,928	930,117	814,896	874,041

Illinois ranked first in 1909, 1904, and 1899 in the slaughtering of each of the kinds of animals for which figures are given. Kansas ranked second in 1909 in the slaughter of beeves and hogs, and New York in the slaughter of calves and sheep and lambs. A comparison of the statistics for 1909 and 1899 indicates a shifting of the slaughter of beeves nearer

to the source of supply, as the absolute increase in Illinois was only 124,140, while the increase in Kansas was 435,233, and in Texas 503,094.

The number of animals of the various kinds slaughtered in 1909, both in wholesale and retail slaughterhouses and on farms and ranges, is given by states in Table 23.

ANIMALS SLAUGHTERED FOR FOOD, IN WHOLESALE AND RETAIL SLAUGHTERHOUSES AND ON FARMS AND RANGES, BY STATES: 1909.

Table 23	STATE.	Aggregate.	TOTAL.		BEEVES.		CALVES.		SHEEP AND LAMBS.		HOGS.		ALL OTHER ANIMALS.	
			In wholesale and retail slaughterhouses.	On farms and ranges.	In wholesale and retail slaughterhouses.	On farms and ranges.	In wholesale and retail slaughterhouses.	On farms and ranges.	In wholesale and retail slaughterhouses.	On farms and ranges.	In wholesale and retail slaughterhouses.	On farms and ranges.	In wholesale and retail slaughterhouses.	On farms and ranges.
	United States.....	88,358,815	69,791,543	18,567,272	12,202,782	1,408,640	5,384,378	1,131,600	14,195,173	529,526	37,841,051	15,378,517	163,161	118,899
	Alabama.....	816,688	170,619	646,069	98,243	42,946	12,905	7,872	10,821	5,251	45,039	581,615	3,611	8,385
	Arizona.....	124,601	94,626	29,975	44,580	10,773	9,142	1,144	11,684	8,125	17,843	3,299	11,377	6,634
	Arkansas.....	806,372	132,351	674,021	68,663	38,088	12,976	8,379	9,566	5,705	48,592	616,350	2,554	5,499
	California.....	2,792,928	2,583,885	209,043	618,283	36,319	177,864	50,538	1,300,010	35,915	478,842	82,270	8,886	4,001
	Colorado.....	691,009	576,868	114,141	117,786	26,818	31,402	11,557	116,607	19,945	310,958	52,081	115	3,740
	Connecticut.....	301,001	257,581	43,420	32,032	8,756	57,818	6,915	18,087	2,685	149,621	25,058	23	6
	Delaware.....	107,841	79,199	28,642	13,087	551	10,315	414	11,374	87	44,422	27,588	1	2
	District of Columbia.....	163,160	162,741	419	16,181	8	26,668	28	42,667	-----	77,223	383	-----	-----
	Florida.....	437,911	115,835	322,076	64,489	22,012	2,450	1,569	8,586	1,484	39,880	294,753	430	2,258
	Georgia.....	1,140,960	213,017	927,943	93,372	37,605	23,532	22,323	11,021	3,552	81,967	860,409	3,125	4,054
	Idaho.....	191,601	118,577	73,024	37,347	12,216	15,377	4,789	25,037	8,494	40,801	47,437	15	88
	Illinois.....	15,622,722	14,736,149	886,573	2,376,787	38,466	676,552	81,079	3,915,651	4,284	7,703,765	762,545	63,394	199
	Indiana.....	3,321,529	2,622,194	699,335	391,426	27,122	145,370	21,731	76,958	3,714	2,007,981	646,581	459	187
	Iowa.....	3,820,358	3,215,109	605,249	413,509	73,454	105,752	18,235	68,434	6,180	2,626,776	507,167	638	213
	Kansas.....	7,546,716	7,124,338	422,378	1,466,432	30,660	233,875	11,536	1,141,531	2,399	4,265,111	377,566	17,389	217
	Kentucky.....	1,267,587	497,844	769,743	103,285	19,011	44,537	4,546	33,903	10,650	314,292	733,642	1,827	1,894
	Louisiana.....	678,280	355,268	323,012	155,337	26,209	126,984	2,667	12,815	3,965	58,587	287,447	1,845	2,724
	Maine.....	342,655	225,868	116,787	28,337	18,755	46,205	27,396	98,542	23,277	52,763	47,319	21	40
	Maryland.....	1,242,668	1,051,317	191,351	94,073	5,870	93,474	2,110	198,800	2,952	664,924	180,406	46	13
	Massachusetts.....	2,259,375	2,201,482	57,893	95,123	13,521	188,212	14,187	348,040	2,412	1,669,032	27,754	1,075	19
	Michigan.....	1,641,055	1,186,358	504,697	215,684	43,619	160,458	61,896	164,414	17,818	595,182	381,247	620	117
	Minnesota.....	2,234,222	1,743,542	490,708	285,696	79,228	164,117	80,493	191,853	16,231	1,151,788	314,597	88	161
	Mississippi.....	676,008	128,554	547,454	69,543	15,428	5,757	9,634	4,845	31,862	498,659	2,087	3,787	
	Missouri.....	4,883,683	3,884,508	999,175	616,614	32,059	109,154	8,779	557,843	7,461	2,600,148	949,318	749	1,558
	Montana.....	303,332	227,849	75,483	65,593	19,755	31,658	8,748	77,002	13,785	53,589	33,143	7	52
	Nebraska.....	4,419,371	4,108,503	310,868	729,608	42,083	86,248	5,458	1,129,725	1,753	2,162,905	261,515	17	59
	Nevada.....	102,247	76,688	25,559	18,877	11,217	8,456	1,416	33,574	6,973	15,218	5,943	563	10
	New Hampshire.....	106,481	58,159	48,322	11,809	9,116	22,616	10,650	9,629	5,987	14,084	22,563	21	6
	New Jersey.....	2,459,109	2,366,952	92,157	88,726	3,175	173,531	14,025	502,672	1,229	1,601,579	73,709	444	19
	New Mexico.....	187,068	60,289	126,779	126,779	16,316	6,775	3,658	13,590	58,839	8,561	21,929	5,578	26,037
	New York.....	6,380,758	5,661,351	719,407	831,980	68,793	614,815	212,962	2,197,416	51,277	2,016,826	386,264	314	111
	North Carolina.....	970,854	124,909	845,945	61,226	36,132	20,360	14,602	20,378	9,763	21,626	783,247	1,319	2,201
	North Dakota.....	331,111	144,532	186,579	50,772	31,570	28,065	14,419	11,305	4,342	54,368	136,227	22	21
	Ohio.....	4,167,471	3,297,213	870,258	540,592	54,040	390,368	31,180	364,809	16,754	2,001,268	768,195	176	89
	Oklahoma.....	688,147	232,609	455,538	93,787	23,043	16,265	5,745	1,662	1,129	119,772	424,436	1,123	1,185
	Oregon.....	566,721	378,274	188,447	108,389	24,292	24,330	40,756	128,506	15,786	115,294	102,755	1,755	4,858
	Pennsylvania.....	3,766,906	2,905,164	861,742	500,637	88,505	485,555	68,936	573,107	28,218	1,343,496	675,939	2,369	144
	Rhode Island.....	90,345	78,048	12,297	5,916	6,699	12,710	1,175	1,681	749	67,738	3,674	3	-----
	South Carolina.....	446,984	109,963	337,021	55,327	17,657	14,173	6,669	6,527	1,409	32,939	309,922	1,237	1,364
	South Dakota.....	332,911	172,307	160,604	56,429	28,475	25,983	7,034	10,348	7,246	79,538	117,781	9	68
	Tennessee.....	1,117,478	314,271	803,207	97,315	33,483	17,368	9,548	32,917	13,490	164,513	742,123	2,158	4,563
	Texas.....	3,347,603	2,338,048	1,009,555	804,533	64,031	333,562	22,445	97,403	9,396	1,074,975	885,260	27,575	28,423
	Utah.....	259,692	195,585	64,107	52,517	8,208	18,094	5,312	94,654	16,579	29,939	31,210	381	2,798
	Vermont.....	203,089	85,401	117,688	24,744	18,832	21,908	41,375	11,519	6,609	27,228	50,786	2	86
	Virginia.....	944,381	372,087	572,294	63,422	20,058	47,453	5,086	35,872	9,185	225,289	537,797	51	168
	Washington.....	998,014	828,023	169,991	174,019	25,087	42,673	44,238	318,083	7,380	291,229	92,600	2,019	686
	West Virginia.....	432,728	253,823	238,905	53,740	18,753	31,370	5,108	21,391	8,269	147,297	206,701	25	74
	Wisconsin.....	2,432,949	1,937,236	545,713	217,209	51,040	415,043	93,167	110,712	15,116	1,193,354	386,243	918	147
	Wyoming.....	82,107	36,429	45,678	13,919	9,810	4,430	1,948	6,813	20,832	11,267	13,064	-----	24

PRODUCTS.

Summary for the United States.—Table 24 shows the quantity and value of each specified product of the slaughtering and meat packing industry as returned for the censuses of 1909, 1904, 1899.

PRODUCT.	1909	1904	1899	Per cent of increase: ¹ 1899-1909
Total value.....	\$1,370,568,101	\$922,037,528	\$788,387,647	73.8
Beef:²				
Pounds.....	4,335,674,330	3,884,952,074	3,055,241,979	41.9
Value.....	\$339,742,600	\$255,204,676	\$220,495,041	54.1
Fresh—				
Pounds.....	4,209,196,668	3,748,055,377	2,917,653,476	44.3
Value.....	\$327,533,456	\$247,096,724	\$210,833,647	55.4
Salted and cured—				
Pounds.....	126,477,662	136,896,697	137,588,503	-8.1
Value.....	\$12,159,152	\$8,107,952	\$9,661,754	25.8
Veal, fresh:				
Pounds.....	252,997,078	154,212,652	84,548,128	199.2
Value.....	\$25,058,886	\$12,856,369	\$7,709,772	225.0
Mutton, fresh:				
Pounds.....	495,457,894	460,754,244	400,812,014	23.6
Value.....	\$50,735,116	\$36,880,455	\$32,681,457	55.2
Pork:²				
Pounds.....	4,377,127,187	4,147,834,872	4,360,705,789	0.4
Value.....	\$486,845,161	\$340,586,644	\$320,469,119	51.9
Fresh—				
Pounds.....	1,547,494,184	1,224,932,910	1,222,007,411	26.6
Value.....	\$158,714,862	\$91,749,323	\$83,964,324	89.1
Salted—				
Pounds.....	952,130,557	1,558,886,256	1,371,384,591	-30.6
Value.....	\$95,959,048	\$116,626,710	\$88,363,629	8.6
Hams—				
Pounds.....	789,861,744			
Value.....	\$101,089,390			
Shoulders—				
Pounds.....	346,294,769	1,364,015,706	1,767,313,787	6.2
Value.....	\$33,225,458	\$132,210,611	\$148,171,166	56.7
Bacon and sides—				
Pounds.....	741,345,933			
Value.....	\$97,856,403			
All other fresh meat:				
Pounds.....	257,809,083	124,307,681	80,387,411	220.7
Value.....	\$16,392,768	\$9,579,718	\$7,810,553	109.9
Sausage, fresh or cured.....	\$59,564,582	\$33,179,235	\$25,982,709	129.2
Canned goods:				
Pounds.....	121,376,837	(³)	112,443,021	7.1
Value.....	\$15,345,543	\$16,114,665	\$9,166,931	67.4
Lard:				
Pounds.....	1,243,567,604	1,169,086,400	1,019,781,839	21.9
Value.....	\$134,396,587	\$82,540,964	\$61,140,234	119.8
Tallow or oleo stock:				
Pounds.....	202,844,139	(³)	(³)	.....
Value.....	\$13,499,659	(³)	(³)	.....
Oleo oil:				
Gallons.....	19,692,172	19,454,799	19,111,120	3.0
Value.....	\$16,475,726	\$10,201,911	\$11,482,542	43.5
Other oils:				
Gallons.....	11,343,186	4,893,133	8,240,569	37.6
Value.....	\$6,350,745	\$2,595,951	\$3,438,358	84.7
Oleomargarine:				
Pounds.....	42,912,466	(³)	(³)	.....
Value.....	\$5,963,981	(³)	(³)	.....
Stearin:				
Pounds.....	54,957,997	(³)	(³)	.....
Value.....	\$6,871,935	(³)	(³)	.....
Soap:				
Pounds.....	5,182,572	49,838,856	(³)	.....
Value.....	\$200,765	\$1,815,154	(³)	.....
Glue and gelatine:				
Pounds.....	27,936,035	17,526,456	(³)	.....
Value.....	\$1,944,338	\$1,087,719	(³)	.....
Fertilizers and fertilizer materials:				
Tons (2,000 pounds)....	362,136	369,074	*168,505	114.9
Value.....	\$8,726,818	\$7,204,061	*\$3,300,042	164.4
Hides:				
Number.....	9,560,138	8,039,204	6,249,414	53.0
Pounds.....	504,563,930	456,443,857	335,968,207	50.2
Value.....	\$68,401,515	\$44,206,107	\$33,883,026	101.9
Sheep pelts:				
Number.....	11,691,308	*11,344,544	(³)	.....
Value.....	\$11,404,566	*\$8,964,643	(³)	.....
Goat and kid skins:				
Number.....	33,359	(³)	(³)	.....
Value.....	\$20,679	(³)	(³)	.....
Wool:				
Pounds.....	21,858,926	16,377,333	13,176,686	65.9
Value.....	\$8,327,095	\$5,229,521	\$3,334,439	149.7
Amount received for custom or contract work.....	\$1,329,739	\$198,825	\$141,154	842.0
All other products.....	\$92,969,299	\$53,590,910	\$47,331,910	96.8

¹ A minus sign (—) denotes decrease.
² Includes only products specified.
³ Figures not available.
⁴ Includes fertilizers only. Figures not available for fertilizer materials.
⁵ Includes pelts purchased for wool pulling.

There were increases during the decade 1899 to 1909 both in quantity and in value of all the products enu-

merated in Table 24, with the exception of salted or cured beef and salted pork, each of which showed a decrease in quantity. The largest relative increase in value is shown for fresh veal, 225 per cent. "All other fresh meat," which includes goat and kid meat and dressed poultry, and also edible offal—such as hearts, tongues, livers, heads, etc.—increased 109.8 per cent in value during the decade.

Of the products other than meats, lard is the most important, showing an increase during the decade of 21.9 per cent in quantity and of 119.8 per cent in value. No statistics relative to the manufacture of oleomargarine in slaughtering and meat packing establishments were collected at censuses prior to 1909. Of the total number of hides taken from animals slaughtered by establishments in the slaughtering and meat packing industry, approximately 8,115,000 were cattle hides and 1,445,000 calfskins. In addition, a large number of calfskins were sold on the carcasses. From 1899 to 1909 the quantity of wool taken from animals slaughtered by establishments in this industry increased 65.8 per cent, and the value 149.7 per cent.

All products not specifically called for on the schedule are included under "all other products." Among these are lard substitutes and compound lard, sausage casings, scrapple, pickled tripe, pigs' feet, poultry and animal food, hogs' hair, ice, and also special kinds of cars for the transportation of products.

Pork, beef, mutton, and veal, in the order named, are the four most important products for which separate quantities and values are given in Table 24. In 1909 the total quantity of these products amounted to 9,461,256,489 pounds, as compared with 8,647,753,842 pounds in 1904 and 7,901,307,910 pounds in 1899.

Table 25 shows the proportion which the quantity reported for each of these products formed of the combined total at the three censuses, and also the percentage of increase in the quantity of each during the period.

KIND.	FOUR LEADING EDIBLE PRODUCTS OF SLAUGHTERING AND MEAT PACKING ESTABLISHMENTS.					
	Per cent of total.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Total.....	100.0	100.0	100.0	19.7	9.4	9.4
Pork, fresh and cured.....	46.3	48.0	55.2	0.4	5.5	-4.9
Beef, fresh and cured.....	45.8	44.9	38.7	41.9	11.6	27.2
Mutton.....	5.2	5.3	5.1	23.6	7.5	15.0
Veal.....	2.7	1.8	1.1	199.2	64.1	82.4

¹ A minus sign (—) denotes decrease.

The quantity of pork produced was practically the same in 1909 as in 1899. The three other kinds of meat listed in the table, on the other hand, increased considerably, so that, although pork still held first place, it showed a pronounced decline in importance as compared with the others. The quantity of veal reported almost trebled during the decade.

Subsidiary products.—Many establishments in the slaughtering and meat-packing industry make large quantities of subsidiary products, some of which form the chief products of other industries distinguished by the census. A number of the large concerns kept separate accounts for the branches or departments making certain of these subsidiary products, especially for those making fertilizers and soap, and in such cases separate reports were secured for these departments, which were treated as individual establishments. The total value of the products of these separately reported departments of slaughtering and meat packing establishments amounted in the aggregate to \$32,661,669. In cases, however, where it was impracticable to obtain separate statistics for these subsidiary products they were included in the general operations of the slaughtering and meat packing industry.

In Table 26 is shown the value of several of these products manufactured in establishments reported as engaged primarily in the production of the same, and also the value of such products reported by the establishments in the industry.

PRODUCT.	Value of all products of establishments engaged primarily in making the product specified. ¹	Value of specified products reported by establishments in the slaughtering and meat packing industry.
Fertilizers.....	\$103,960,213	\$8,726,818
Glue and gelatine.....	13,717,820	1,944,338
Lard.....	10,326,471	134,396,587
Oleomargarine.....	8,147,629	5,963,981
Soap.....	111,357,777	200,765

¹ Includes, in some cases, products other than those specified.

The total value of products shown for establishments engaged primarily in the manufacture of the five classes of products shown in Table 26 amounted to \$247,509,910. This includes products to the value of \$21,490,269 manufactured by separately reported departments of slaughtering and meat packing establishments. The total value of these products reported as produced in the slaughtering and meat packing industry amounted to \$151,232,489. If to this amount be added the \$21,490,269 included in the figures for the five industries mentioned, the value of these products actually produced by the slaughtering and meat packing establishments amounted to \$172,722,758, or 43.3 per cent of the total value of such products, shown in Table 26.

The value of oleomargarine manufactured in slaughtering and meat packing establishments was nearly three-fourths as great as that made in establishments engaged primarily in the manufacture of this product, while the value of lard manufactured by slaughtering and meat packing establishments was over 13 times the value of that produced in establishments or departments of the same reported as lard rendering plants.

Products, by states.—Table 27 shows, by states, the quantity and value of certain leading products of the slaughtering and meat packing industry in 1909, and the quantity produced in 1904 and 1899.

Statistics with respect to the specified class of products are shown only for the states reporting a production of at least 59,000,000 pounds of fresh beef; 5,000,000 pounds of fresh veal and mutton; 32,000,000 pounds of fresh pork; 23,000,000 pounds of salt pork; 18,000,000 pounds of ham; 29,000,000 pounds of shoulders, bacon, and sides; 19,000,000 pounds of lard; 4,000,000 pounds of hides; and 100,000 sheep pelts.

The prominence of Illinois in the industry is illustrated by the fact that this state ranked first at each of the last three censuses in output of each of the specified products named in Table 27, with the single exception that New York produced more veal than Illinois in 1899. The percentages of the total output reported by Illinois in 1909 and 1899, respectively, were as follows: Beef, 27.2 and 35.7 per cent; veal, 20.3 and 20.9 per cent; mutton, 31.8 and 36.9 per cent; fresh pork, 19.6 and 33.7 per cent; salt pork, 33.2 and 38.1 per cent; hams, 19.6 and 29.1 per cent; shoulders, 22.9 and 18.9 per cent; lard, 32.4 and 36.5 per cent; and hides, 26.9 and 38.3 per cent.

The largest absolute increase in fresh beef for the decade reported by any state was 234,640,370 pounds in Kansas, while Texas showed the largest relative gain. The largest absolute increase in the production of veal reported for the period by any state was 33,685,297 pounds in Illinois, followed by an increase of 28,335,074 pounds in Texas. The largest absolute increase in output of mutton for the decade was reported for Kansas, and the greatest percentage of increase (239.8 per cent) for Ohio. Illinois, although reporting an output of fresh pork more than twice as great in 1909 as that reported by any other state, showed a decrease of 107,479,929 pounds in output of this product during the decade. Iowa reported the largest absolute increase, and Texas the largest relative gain from 1899 to 1909. Most of the states reported rather large decreases in the production of salted pork, only a little more than two-thirds as much salt pork (69.4 per cent) being reported in 1909 as was produced in 1899. Only four of the states in the table showed increases between 1899 and 1909—Texas showing the largest relative gain, 582 per cent. The largest percentage of increase in output of hams (355.8 per cent) was for Minnesota, and the largest absolute gain was reported by Kansas. In the production of shoulders, bacon, and sides, Wisconsin showed the largest relative gain (375 per cent) and Iowa the greatest absolute increase. In the production of lard Texas showed the largest gains, absolute as well as relative, increasing 839.9 per cent during the decade.

Table 28 shows, by states, the value of the sausage manufactured in 1909, 1904, and 1899.

STATE.	VALUE OF SAUSAGE.		
	1909	1904	1899
Total	\$59,584,582	\$33,178,235	\$25,982,709
Illinois.....	14,883,731	8,748,970	8,631,356
Kansas.....	2,863,461	1,814,777	1,469,400
Massachusetts.....	4,228,821	2,349,245	2,384,379
Nebraska.....	2,108,874	1,223,537	1,483,558
New Jersey.....	2,864,949	887,349	631,864
New York.....	6,461,809	3,359,825	2,195,581
Ohio.....	3,346,493	1,711,463	1,133,417
Pennsylvania.....	5,421,307	2,805,029	1,532,434
Wisconsin.....	2,476,466	1,448,005	1,095,130
All other states.....	14,908,671	8,831,035	6,424,990

Each state shown in the table reported a large increase in the value of its sausage output, the largest percentage of increase (353.4 per cent) being in New Jersey, and the largest absolute gain in Illinois. Illinois was the leading state in the production of sausage, reporting 25 per cent of the total value in 1909 and 33.2 per cent in 1899.

Imports and exports.—Table 29 shows, for the years ending June 30, 1910, 1905, and 1900, the value of the exports and the imports of different classes of meats and meat products, as distinguished by the Bureau of Foreign and Domestic Commerce.

The total value of exports in 1900 and 1905 was greatly in excess of that of imports, but the difference was much less pronounced in 1910. The total value of exports decreased considerably during the period covered, whereas the value of imports increased. The exports were mainly meats and meat products intended for human consumption, while the imports were principally hides and other animal products intended as raw material for manufacture. The value of hides

and skins imported in 1910 formed 90.3 per cent of the total value of imports, whereas these articles formed but 1.3 per cent of the total value of the exports.

CLASS.	YEAR ENDING JUNE 30—		
	1910	1905	1900
EXPORTS.			
Total value	\$134,878,824	\$169,590,201	\$179,273,924
Beef products:			
Canned.....	1,678,452	6,588,958	5,233,982
Fresh.....	7,733,751	22,138,365	29,643,830
Salted or pickled.....	2,744,886	3,095,304	2,697,340
Other, cured.....	38,815	14,057	197,051
Tallow.....	1,779,615	3,022,173	4,398,204
Hog products:			
Bacon.....	18,381,050	25,428,961	38,975,915
Hams and shoulders, cured.....	17,837,375	21,562,204	20,416,367
Pork, canned.....	459,843	993,394	658,402
Pork, fresh.....	126,888	1,291,794	1,925,772
Pork, pickled.....	4,421,844	9,412,034	8,243,797
Lard.....	43,301,156	47,243,181	41,939,164
Mutton.....	213,477	52,503	64,313
Sausage and sausage meats.....	627,669	671,241	(1)
All other meat products.....	2,391,864	4,242,052	5,665,458
Lard compounds and substitutes.....	6,887,738	3,613,235	1,475,064
Oleo oil and neutral lard.....	14,305,080	11,485,145	10,503,856
Oleomargarine.....	349,972	711,038	416,544
Hides and skins, not fur skins.....	1,738,216	1,051,641	804,674
Glue.....	261,756	279,534	225,844
Oil, lard.....	131,241	154,409	337,260
Bones, hoofs, horns and horn tips, strips and waste.....	150,371	181,203	199,194
Grease, grease scraps and all soap stock.....	4,612,426	3,710,907	2,944,322
Sausage casings.....	4,503,339	2,646,868	2,307,571
IMPORTS.			
Total value	124,249,388	72,763,888	64,673,455
Meat products:			
Meats and meat extracts.....	(1)	674,441	365,589
All other.....	1,086,966	52,223	105,726
Sausages, bologna.....	127,274	147,119	95,944
Grease and oils.....	1,523,327	1,170,514	779,666
Hides and skins, not fur skins.....	* 112,247,836	64,764,146	57,935,698
Glue.....	861,888	701,847	537,492
Bones, horns, and hoofs, unmanufactured.....	1,067,911	926,505	830,063
Bristles, crude, not sorted, bunched or prepared.....	12,937	4,054	22,330
Bristles, sorted, bunched or prepared.....	3,111,872	2,366,444	2,130,537
Hide cuttings, raw, and glue stock.....	1,605,432	1,120,070	1,223,521
Sausage casings.....	2,604,895	836,323	646,839

¹ Included in "all other meat products."

² All hides were free of duty on and after August 6, 1909.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the slaughtering and meat packing industry are presented, by states, in Tables 30 and 31.

Table 30 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the in-

dustry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 31 gives more detailed statistics for the industry for 1909 only.

SLAUGHTERING AND MEAT PACKING—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.						Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).				
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).	Expressed in thousands.												
United States.....	1909 1904 1899	1,641 1,221 1,080	108,716 88,819	1,659 1,324	17,329 12,096 10,317	89,728 78,399 69,264	208,707 119,311 87,060	\$383,249 240,419 190,209	\$20,054 13,453 10,211	\$51,845 41,067 33,848	\$1,202,828 811,428 685,310	\$1,370,568 822,038 788,368	\$167,740 110,612 103,058						
California.....	1909 1904 1899	94 76 64	2,135 1,659	111 84	383 288 182	1,641 1,287 989	3,867 2,093	11,463 4,879 3,952	550 351 255	1,307 914 553	28,448 18,752 13,616	34,280 22,013 15,817	5,832 3,261 2,201						
Colorado.....	1909 1904 1899	13 11 14	834 393 316	5 4 7	170 52 48	659 247 261	2,450 888	3,653 1,107 1,381	210 55 61	389 175 171	8,295 2,782 3,722	9,657 3,324 4,344	1,362 842 622						
Connecticut.....	1909 1904 1899	28 26 19	523 426	28 29	63 26 38	432 371 403	590 461	1,967 733 587	62 22 37	239 204 188	3,949 2,809 3,259	4,572 3,218 3,835	623 409 576						
Delaware.....	1909 1904 1899	9 15 6	123 58	8 6	33 5 22	82 47 42	212 160	289 143 252	25 4 14	53 26 23	1,231 477 462	1,372 548 547	141 71 85						
District of Columbia.....	1909 1904 1899	5 3 6	214 107 129	2 1 7	77 13 31	135 93 91	345 108	1,037 280 206	73 19 16	90 69 43	1,470 475 981	1,890 615 1,131	420 140 150						
Georgia.....	1909 1904 1899	8 6 7	113 84 146	9 4 8	14 4 34	90 76 104	262 321	168 228 116	9 1 20	34 29 32	402 219 484	509 321 591	107 102 107						
Idaho.....	1909 1904 1899	4 3	56 19	1 2	16 7	39 10	115 22	343 93	16 9	33 8	451 120	532 159	81 39						
Illinois.....	1909 1904 1899	109 95 78	32,642 32,856	93 99	5,844 5,646 4,236	26,705 27,111 27,991	56,651 39,400	131,026 80,733 71,594	6,440 6,571 4,432	14,602 14,658 14,115	343,976 280,592 247,215	389,595 318,201 288,672	45,619 37,609 41,457						
Indiana.....	1909 1904 1899	61 50 39	4,862 3,400	64 46	375 199 303	4,423 3,155 3,604	6,973 4,388	8,058 7,424 8,876	690 249 315	2,161 1,371 1,570	41,986 26,249 33,629	47,989 29,435 43,890	5,303 3,186 5,261						
Iowa.....	1909 1904 1899	33 25 31	4,849 3,409 3,118	33 21 25	672 284 193	4,144 3,104 2,900	8,309 4,273	12,362 7,326 6,370	654 229 197	2,190 1,332 1,215	53,127 27,244 21,604	59,045 30,152 25,763	5,918 2,908 4,169						
Kansas.....	1909 1904 1899	35 22 14	12,265 10,394 9,967	23 19 9	1,651 983 1,841	10,591 9,392 8,117	24,560 13,733 11,212	37,869 23,332 16,486	1,797 984 1,632	5,862 4,836 3,575	147,646 85,146 67,909	165,361 96,376 77,412	17,715 11,230 9,503						
Kentucky.....	1909 1904 1899	37 22 28	446 548 604	44 30 31	48 46 62	354 472 511	853 887	1,269 1,464 1,327	61 44 52	251 243 214	5,746 4,595 4,445	6,568 5,694 5,177	822 1,099 732						
Louisiana.....	1909 1904 1899	10 16 18	210 32	10 9	18 2	132 21	396 39	507 25	17 1	68 10	98 54	276 91	173 37						
Maine.....	1909 1904 1899	20 12 11	152 190 56	19 13 12	26 17 6	107 160 38	213 359 52	197 316 133	21 13 3	58 86 18	785 524 457	957 723 554	172 199 97						
Maryland.....	1909 1904 1899	54 44 60	1,324 683	61 61	229 60 43	1,034 582 465	3,024 1,204	3,808 1,322 1,213	265 58 28	604 320 220	11,508 5,888 6,730	13,883 6,843 6,391	2,180 980 661						
Massachusetts.....	1909 1904 1899	94 80 43	3,832 3,520 3,148	87 81 48	420 412 226	3,325 3,027 2,874	4,844 3,396	15,547 12,983 11,445	488 402 253	1,837 1,595 1,390	38,886 33,881 28,591	44,403 33,012 32,344	5,517 4,131 3,753						
Michigan.....	1909 1904 1899	45 28 32	1,114 590	65 28	167 63 72	902 499 469	3,404 959	3,584 1,378 1,450	152 65 67	481 265 236	11,666 5,630 4,820	13,435 6,356 6,402	1,769 726 582						
Minnesota.....	1909 1904 1899	30 29 20	2,452 1,691 820	28 34 27	603 281 125	1,921 1,376 668	4,579 1,669 960	7,881 3,437 1,355	510 254 102	1,129 788 304	22,158 15,104 8,823	25,754 17,589 7,811	3,598 2,485 988						
Missouri.....	1909 1904 1899	45 38 40	5,529 4,862 3,412	34 29 36	821 697 251	4,674 4,236 3,125	11,735 7,685	18,787 16,449 7,969	845 623 260	2,673 2,381 1,454	72,198 54,099 39,182	79,581 60,110 43,162	7,383 6,011 3,980						
Nebraska.....	1909 1904 1899	18 9 12	7,221 6,462 6,818	20 3 7	1,186 869 721	6,015 5,989 6,090	11,873 6,328 7,192	19,414 20,606 16,625	1,420 936 684	3,372 3,159 2,991	78,358 61,278 63,048	92,305 69,329 71,280	13,947 8,051 8,232						
New Hampshire.....	1909 1904 1899	8 7 6	37 15 20	10 7 8	3 2 12	24 8	87 28	62 15 9	2 4 6	14 4 28	165 26 43	199 38 43	34 12 15						
New Jersey.....	1909 1904 1899	84 48 50	2,420 518 760	93 68 69	510 105 100	1,817 745 661	3,610 949	8,182 2,593 1,670	633 117 94	1,286 488 352	33,740 16,071 12,965	37,583 17,754 14,215	3,843 1,683 1,250						
New York.....	1909 1904 1899	238 151 168	7,583 4,654 4,109	262 183 209	1,211 710 612	6,110 3,761 3,288	13,936 7,271	34,536 18,102 15,718	1,690 872 593	4,387 2,592 1,949	110,168 66,778 51,173	127,130 75,550 58,498	16,962 8,772 7,230						

¹ Exclusive of statistics for two establishments, to avoid disclosure of individual operations.

² Exclusive of statistics for one establishment, to avoid disclosure of individual operations.

SLAUGHTERING AND MEAT PACKING—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

Table 30—Continued.	STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
				Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.														
Ohio	1909	158	3,864	154	624	3,086	9,873	\$12,399	\$687	\$1,857	\$44,347	\$50,804	\$6,457	
	1904	105	2,750	119	316	2,315	4,434	6,465	294	1,355	25,311	29,155	3,844	
	1899	77	2,193	96	313	1,784		5,395	266	823	18,007	20,768	2,761	
Oklahoma	1909	7	86	7	16	63	236	290	18	43	749	889	140	
	1904	4	46	6	1	39	52	125	4	22	239	294	55	
	1899													
Oregon	1909	14	493	14	113	366	752	2,481	124	280	5,015	5,880	865	
	1904	10	313	7	60	246	327	975	73	155	2,390	2,907	517	
	1899	9	222	9	41	172		760	47	88	1,359	1,638	279	
Pennsylvania	1909	180	3,957	198	709	3,050	12,139	13,504	862	1,987	44,845	51,851	7,006	
	1904	177	3,074	205	341	2,528	7,366	8,338	367	1,518	28,340	33,101	4,761	
	1899	131	2,283	183	377	1,723		6,636	318	945	21,806	25,537	3,731	
Rhode Island	1909	21	267	26	27	214	428	593	53	122	2,794	3,156	362	
	1904	16	223	22	15	186	357	562	13	105	2,384	2,657	273	
	1899	13	278	20	27	231		779	26	123	2,294	2,596	302	
Tennessee	1909	27	379	31	68	280	1,242	2,516	61	140	1,610	2,057	447	
	1904	22	81	13	9	59	936	408	8	24	274	377	103	
	1899	13			15	166		680	17	66	1,480	1,712	232	
Texas	1909	14	4,248	1	608	3,639	11,330	12,438	698	1,902	37,410	42,530	5,120	
	1904	9	2,354	2	333	2,019	2,086	6,375	323	866	13,593	15,621	2,028	
	1899	12	469	6	49	414	1,640	1,232	62	180	3,171	3,904	733	
Utah	1909	12	150	7	44	99	572	564	38	77	1,327	1,690	363	
	1904	3	41	1	9	31	25	148	10	21	514	653	139	
	1899	8	62	14	6	42	69	117	2	19	385	453	68	
Virginia	1909	24	444	23	79	342	1,491	2,251	85	118	4,057	4,601	544	
	1904	14	200	12	30	158	650	683	28	69	1,746	1,996	250	
	1899	3	63	4	17	42		157	13	18	477	560	83	
Washington	1909	14	971	4	139	828	1,883	5,103	233	575	13,760	15,654	1,894	
	1904	13	402	9	58	335	550	2,284	79	287	5,423	6,252	829	
	1899	18	337	18	88	231	474	1,014	81	157	4,252	4,893	641	
West Virginia	1909	6	209	4	38	167	1,321	1,116	39	123	3,385	3,764	379	
	1904	6	168	6	29	133	635	478	20	74	1,668	1,928	260	
	1899	3	103	3	16	84	356	313	12	43	1,134	1,338	204	
Wisconsin	1909	48	2,263	56	317	1,890	3,283	6,629	386	1,042	23,403	27,217	3,814	
	1904	23	1,762	26	156	1,580	2,457	4,887	197	782	14,072	16,569	2,497	
	1899	19	1,660	26	133	1,501		4,081	164	611	12,244	14,142	1,898	
All other states	1909	34	449	34	117	298	1,769	1,356	140	259	3,676	4,499	823	
	1904	35	525	35	70	420	2,815	1,723	88	236	6,679	8,072	1,393	
	1899	36			89	291		654	88	154	3,558	4,043	485	

1 Figures can not be shown without disclosure of individual operations.
 2 Excluding statistics for one establishment, to avoid disclosure of individual operations.
 3 Excluding statistics for two establishments, to avoid disclosure of individual operations.

Table 31		PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Pri- mary horse- power.
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.				
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.			
								Maximum month.	Minimum month.								
1 United States	1,841	108,718	1,659	1,855	13,794	1,680	89,728	De	96,234	Ap	84,568	94,854	88,352	6,680	499	43	208,707
2 Alabama	4	63	.....	6	8	2	47	Au	73	Ap	33	52	52	.....	.....	.....	795
3 California	94	2,135	111	105	249	29	1,641	De	1,709	Je	1,586	1,723	1,678	31	13	1	3,867
4 Colorado	13	834	5	24	136	10	659	Je	692	Se ¹	634	647	620	14	13	.....	2,450
5 Connecticut	28	523	28	11	37	15	432	Ja ¹	465	My	397	456	450	3	3	.....	590
6 Delaware	9	123	8	6	26	1	82	Ja ¹	88	Au	75	84	83	1	.....	.....	212
7 District of Columbia	5	214	2	12	56	9	135	Oc	159	Je ¹	123	138	138	.....	.....	.....	345
8 Florida	11	59	19	4	4	.....	32	Mh	34	De	28	40	40	.....	.....	.....	.....
9 Georgia	8	113	9	3	8	3	90	Mh	101	Au	79	95	95	.....	.....	.....	262
10 Idaho	4	56	1	4	11	1	39	Ja ²	39	Jy ²	39	39	38	1	.....	.....	115
11 Illinois	109	32,642	93	246	5,148	450	26,705	De	29,652	My	24,293	28,755	25,537	3,175	40	3	56,651
12 Indiana	61	4,862	64	72	280	23	4,423	De	4,884	My	3,983	4,888	4,513	290	80	5	5,973
13 Iowa	33	4,849	33	130	498	44	4,144	Ja	5,125	Oc	3,763	4,247	3,936	185	126	.....	8,309
14 Kansas	35	12,265	23	134	1,384	133	10,591	No	11,471	Mh	9,788	11,059	10,230	818	10	1	24,560
15 Kentucky	37	446	44	14	34	.....	354	Ja	377	Ap	323	366	365	1	.....	.....	853
16 Louisiana	10	210	10	8	9	1	182	Se	192	My	177	184	184	.....	.....	.....	896
17 Maine	20	152	19	8	11	7	107	No	123	Jy	96	123	123	.....	.....	.....	213
18 Maryland	54	1,324	61	40	173	16	1,034	De	1,107	Je	990	1,107	1,104	1	2	.....	3,024
19 Massachusetts	94	3,832	87	54	305	61	3,325	Ja	3,552	My	3,176	3,371	3,310	37	22	2	4,844
20 Michigan	45	1,114	55	30	107	20	902	De	962	My	864	923	889	28	6	.....	3,404
21 Minnesota	30	2,452	28	40	427	36	1,921	Ja	2,313	Au	1,623	1,852	1,806	40	6	.....	4,579
22 Missouri	45	5,529	34	95	647	79	4,674	Fe	4,903	My	4,367	4,822	4,658	158	6	.....	11,735
23 Montana	9	162	3	13	37	4	105	No	113	Mh	97	104	100	4	.....	.....	316
24 Nebraska	18	7,221	20	32	1,014	140	6,015	Fe	6,794	Ap	5,643	6,316	5,851	398	50	17	11,873
25 New Hampshire	8	37	10	3	3	.....	24	Ja ²	24	Jy ²	24	24	24	.....	.....	.....	87
26 New Jersey	84	2,420	93	81	366	63	1,817	Ja	2,056	Au	1,617	1,820	1,742	76	2	.....	3,610
27 New York	238	7,583	262	155	846	210	6,110	De	6,313	Au	5,893	6,260	6,082	172	4	2	13,935
28 Ohio	163	3,864	154	158	404	62	3,086	De	3,219	Ap	2,993	3,203	3,133	70	.....	.....	9,873
29 Oklahoma	7	86	7	6	8	2	63	De	91	Fe	43	91	91	.....	.....	.....	236
30 Oregon	14	493	14	12	87	14	366	De	418	Mh	346	417	414	3	.....	.....	752
31 Pennsylvania	180	3,957	198	141	484	84	3,050	De	3,184	Au	2,940	3,183	3,154	22	7	.....	12,139
32 Rhode Island	21	267	26	7	14	6	214	De	230	Jy ¹	204	230	227	.....	3	.....	428
33 Tennessee	27	379	31	23	38	7	280	De	633	My	151	631	591	39	1	.....	1,242
34 Texas	14	4,248	1	42	527	39	3,639	My	3,856	Ja	3,452	4,039	3,703	258	68	10	11,330
35 Utah	12	150	7	17	24	3	99	De	111	Ap	86	111	110	1	.....	.....	572
36 Virginia	24	444	23	26	41	12	342	Ja	424	My	297	415	394	20	1	.....	1,491
37 Washington	14	971	4	34	78	27	828	De	956	Ja	772	962	938	24	.....	.....	1,883
38 West Virginia	6	209	4	10	26	2	167	Au	172	Ap	164	165	165	.....	.....	.....	1,321
39 Wisconsin	48	2,263	56	41	216	60	1,890	Ja	2,600	Se	1,612	1,776	1,656	91	27	2	3,283
40 All other states ³	10	165	12	11	23	5	114	.....	.....	.....	.....	136	128	.....	8	.....	658

¹ Same number reported for one or more other months.² Same number reported throughout the year.

SLAUGHTERING AND MEAT PACKING.

353

DETAILED STATISTICS, BY STATES: 1909.

Capital.	EXPENSES.										Value of products.	Value added by manu- facture (value of products less cost of materials).
	Total.	Services.			Materials.		Miscellaneous.					
		Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1 \$383,249,170	\$1,317,368,878	\$4,915,328	\$15,138,631	\$51,644,720	\$8,700,834	\$1,196,128,950	\$1,218,598	\$2,028,345	\$414,895	\$39,180,581	\$1,370,568,101	\$187,740,317
2 198,059	247,845	7,700	8,143	25,299	13,285	185,213	.....	1,210	.....	6,995	320,451	121,963
3 11,463,407	31,533,926	246,164	303,557	1,306,846	184,764	28,263,293	49,849	41,875	3,743	1,133,835	34,280,003	5,831,046
4 3,653,300	9,243,976	61,054	148,519	389,133	67,907	8,226,872	1,970	19,141	.....	329,380	9,656,810	1,362,031
5 1,966,531	4,341,420	18,920	43,453	239,172	29,948	3,918,985	6,000	9,960	.....	74,982	4,572,225	623,292
6 288,932	1,352,564	7,994	17,100	52,736	5,628	1,225,538	480	1,660	3,172	38,256	1,371,853	140,687
7 1,036,701	1,793,169	26,300	46,436	90,478	17,985	1,451,723	1,200	1,710	16,637	140,700	1,889,676	419,867
8 101,512	434,476	8,160	1,950	20,193	482	391,870	996	885	.....	10,440	487,084	75,232
9 168,150	468,038	2,100	7,357	34,110	15,528	385,987	4,044	1,709	884	509,348	107,831	107,831
10 343,199	511,529	6,120	9,720	32,763	4,584	445,976	1,500	2,749	.....	8,117	531,702	81,142
11 131,026,247	378,189,429	1,007,485	5,432,564	14,601,961	1,485,207	342,490,800	165,663	619,147	230,732	12,255,870	389,594,906	45,618,839
12 8,057,732	45,929,846	185,508	504,626	2,160,644	205,108	41,780,866	26,149	84,963	6,469	975,513	47,289,469	5,303,495
13 12,361,660	57,528,943	233,927	420,019	2,190,101	355,878	52,771,493	29,765	43,304	.....	1,484,451	59,045,232	5,917,856
14 37,869,081	159,989,169	319,343	1,477,714	5,862,083	764,087	146,881,903	2,175	415,956	10,077	4,255,831	165,360,516	17,714,526
15 1,268,876	6,179,132	35,360	25,805	251,325	36,478	5,709,380	1,844	12,093	.....	106,847	6,668,077	822,219
16 506,656	217,790	10,700	6,596	67,589	24,018	74,187	780	8,024	.....	25,896	276,464	178,249
17 196,648	889,119	12,566	8,338	57,634	6,452	778,695	2,472	1,370	756	20,436	956,955	171,908
18 3,807,576	12,853,466	98,278	166,916	603,512	131,355	11,371,261	13,730	16,396	.....	452,018	13,682,951	2,180,335
19 15,547,180	42,124,655	144,337	343,683	1,837,166	231,950	38,654,189	56,095	106,718	.....	760,517	44,402,972	5,516,833
20 3,584,247	12,632,575	56,818	95,400	481,245	59,329	11,606,496	2,872	18,630	.....	311,785	13,435,114	1,769,289
21 7,881,017	24,328,914	92,804	417,464	1,128,869	190,034	21,966,249	7,157	44,669	450	481,318	25,757,697	3,597,414
22 18,786,840	78,268,807	225,120	619,647	2,672,620	363,710	71,834,554	18,953	35,161	.....	2,499,042	79,581,294	7,383,030
23 482,955	2,012,975	25,640	39,591	91,658	13,785	1,767,250	19,010	3,965	.....	52,076	2,053,609	272,574
24 19,413,614	87,072,883	174,533	1,245,471	3,372,439	562,777	77,795,101	128,877	74,859	1,300	3,717,526	92,305,484	13,947,606
25 62,482	188,527	.....	2,352	14,216	2,671	161,841	400	509	.....	4,538	199,221	34,709
26 8,181,651	36,575,130	205,873	426,761	1,286,317	166,444	33,673,140	88,851	47,405	68,589	711,750	37,583,395	3,843,811
27 34,535,822	120,932,634	547,403	1,142,417	4,387,005	507,208	109,661,026	239,879	243,327	23,575	4,180,794	127,130,051	16,961,817
28 12,398,691	48,174,845	279,518	407,343	1,856,502	224,429	44,122,733	21,769	74,172	7,750	1,180,629	50,804,100	6,456,938
29 290,152	842,866	7,700	10,408	42,777	6,679	742,143	4,195	1,562	6	27,396	889,237	140,415
30 2,481,137	5,636,593	29,423	94,803	280,104	87,209	4,957,637	16,834	8,531	.....	192,052	5,879,615	864,769
31 13,504,379	49,153,605	348,881	513,279	1,986,965	239,663	44,605,384	112,672	63,602	29,005	1,254,154	51,850,936	7,005,889
32 593,467	3,005,325	38,072	14,733	121,726	11,637	2,782,719	6,266	2,328	.....	27,844	3,156,308	361,952
33 2,516,295	1,895,094	31,270	29,736	140,275	33,110	1,577,000	2,904	8,801	1,750	70,248	2,056,719	446,609
34 12,438,479	40,949,097	98,780	599,029	1,901,674	388,795	37,020,990	115,752	43,340	.....	780,737	42,629,746	6,119,961
35 564,496	1,534,639	19,565	18,399	76,671	17,742	1,309,052	3,624	4,464	.....	85,122	1,600,446	363,652
36 2,290,799	4,308,501	45,685	38,943	117,684	23,663	4,033,490	7,140	7,130	.....	34,766	4,600,830	543,477
37 5,103,334	15,009,578	107,020	126,379	574,839	81,946	13,678,036	7,849	23,874	.....	409,635	15,653,998	1,894,016
38 1,115,912	3,627,819	16,500	22,394	123,356	20,193	3,364,634	1,380	4,985	.....	74,377	3,763,888	379,061
39 6,629,094	25,843,283	114,105	271,467	1,041,772	130,301	23,273,134	31,060	23,894	10,000	947,560	27,216,864	3,813,429
40 573,060	1,546,696	18,600	29,619	123,261	18,865	1,286,705	16,440	2,367	.....	50,839	1,657,168	351,598

* All other states embrace: Nevada, 2 establishments; North Carolina, 2; South Carolina, 2; South Dakota, 1; Vermont, 2; Wyoming, 1.

BUTTER, CHEESE, AND
CONDENSED MILK

THE BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

GENERAL STATISTICS.

The manufacture of butter, cheese, and condensed milk is treated in this report as a single industry, but tables are presented giving most of the important statistics for each of the three branches separately. The general statistics shown for each branch represent the complete returns of those establishments reporting the designated commodity as their product of chief value. The value of products shown for the butter-making branch of the industry, for example, may include the value of cheese or condensed milk manufactured incidentally in factories engaged primarily in the manufacture of butter. Tables 22 to 25, however, show the total quantity of butter, cheese, and condensed milk manufactured by all establishments in the industry.

Factories of considerable size are sometimes operated as adjuncts to farms, but such factories are considered a part of the farm equipment and are covered by the census of agriculture rather than by that of manufactures. The present report is therefore confined to establishments operated independently of farming activities. In Table 4, however, the combined production of butter and cheese on farms and in the factories covered by the census of manufactures is shown. This represents approximately the total output of butter and cheese for the United States.

Skimming or separating stations operated in connection with a butter factory are counted as a part of that factory. Independent separating stations, a small number of which are included among the establishments shown for 1899, have not been included at any later census. Enterprises engaged primarily in the buying and selling of milk and cream, but manufacturing small quantities of butter or cheese incidentally from surplus stock, were likewise excluded from the canvass for 1904 and 1909.

In many cases a number of factories or creameries situated in different localities but operated under the same management have been reported as a single establishment. Where factories so operated were situated in different states, however, separate reports were secured for those in each state; and separate reports were likewise secured for any factories located in a city of 10,000 inhabitants or over. (See Introduction.)

Summary for the three branches of the industry.—Table 1 presents a summary of the statistics of the butter, cheese, and condensed milk industry for the United States as a whole for 1909. It distinguishes

three classes of factories, namely, those engaged primarily in the manufacture of butter, of cheese, and of condensed milk.

Table 1	Total for the industry.	ESTABLISHMENTS ENGAGED PRIMARILY IN THE MANUFACTURE OF—		
		Butter.	Cheese.	Condensed milk.
Number of establishments...	8,479	4,783	3,560	136
Persons engaged in the industry.....	31,506	19,380	7,164	4,962
Proprietors and firm members.....	8,019	3,855	4,148	16
Salaried employees.....	5,056	3,962	312	782
Wage earners (average number).....	18,431	11,563	2,704	4,164
Primary horsepower.....	101,349	78,123	11,638	11,588
Capital.....	\$71,283,616	\$43,017,467	\$9,028,906	\$18,237,242
Expenses.....	258,698,374	184,716,990	41,341,269	32,640,115
Services.....	14,671,932	9,691,151	1,825,270	3,155,511
Salaries.....	3,590,624	2,449,898	155,408	985,318
Wages.....	11,081,308	7,241,253	1,669,862	2,170,193
Materials.....	235,546,064	169,646,441	39,021,766	26,877,857
Miscellaneous.....	8,480,378	5,379,398	494,233	2,806,747
Value of products.....	274,557,718	194,999,198	44,263,177	35,295,343
Value added by manufacture (value of products less cost of materials).....	39,011,654	25,352,757	5,241,411	8,417,486

Of the 8,479 establishments engaged in the industry in 1909, 56.4 per cent reported butter as their product of chief value, 42 per cent cheese, and 1.6 per cent condensed milk. Of the total value of products shown for the combined industry, the butter factories contributed \$194,999,198, or 71 per cent; the cheese factories \$44,263,177, or 16.1 per cent; and the condensed milk factories \$35,295,343, or 12.9 per cent.

In this industry the cost of materials constitutes a very large proportion of the total value of products, the processes of manufacture being relatively simple and inexpensive. The cost of the materials used in 1909 was \$235,546,064, forming 85.8 per cent of the value of products, while the value added by manufacture (that is, the value of products less the cost of materials) was only \$39,011,654. The factories of the industry gave employment to an average of 31,506 persons during 1909, and paid out in salaries and wages a total of \$14,671,932. Of the persons engaged in the industry, 18,431 were wage earners, 5,056 were salaried employees, and 8,019 were proprietors and firm members.

The distribution of the establishments in the industry in 1909, according to the kind of products made, is shown in Table 2.

Of the total number of establishments in the industry in 1909, 7,965, or 93.9 per cent, were engaged exclusively in the manufacture of one of the three main products of the industry, and these reported

the bulk of the respective products. The establishments which manufactured more than one of these products had an output of 29,739,917 pounds of butter, or 4.8 per cent of the total production; 52,147,520 pounds of cheese, or 16.8 per cent of the total; and 72,654,628 pounds of condensed milk, or 14.7 per cent of the total.

PRODUCT.	Number of establishments.
Total.....	8,479
Butter only.....	4,612
Cheese only.....	3,254
Condensed milk only.....	99
Butter and cheese.....	452
Butter, cheese, and condensed milk.....	9
Butter and condensed milk.....	44
Cheese and condensed milk.....	9

Comparison with earlier censuses for the industry as a whole.—Table 3 summarizes the statistics of the butter, cheese, and condensed milk industry for each census from 1879 to 1909, inclusive.

Comparative figures for the industry as a whole are not available for any date prior to 1879, nor does it appear that all three branches of the industry had taken definite form much before that time. The census reports for 1849 gave statistics for 8 factories in Ohio engaged in the manufacture of cheese and reporting

products valued at \$67,210, and the reports for 1859 presented statistics for 2 cheese factories, with products valued at \$13,400. The census of 1869 showed 1,313 cheese factories, with products valued at \$16,771,665, but it was not until 1879 that the manufacture of butter as a factory industry was noted in the census reports. One establishment engaged in the manufacture of condensed milk, with products valued at \$48,000, was reported for 1859, but no statistics for the production of this commodity appear in the reports for 1869. At the census of 1879, however, the production of condensed milk to the value of \$1,547,588 was reported. The value of products reported at this census for butter factories was \$3,868,235; for cheese factories, \$13,991,221; and for factories making both butter and skim-milk cheese, \$6,335,466, about \$3,000,000 of this amount representing the value of the butter produced by these factories.

The value of products reported for the butter, cheese, and condensed milk industry as a whole was nearly eleven times as great in 1909 as in 1879. Some of this increase, however, may be accounted for by the increase in the price of all kinds of dairy products. The relative increase in the cost of materials was greater than that in the value of products.

	BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.									
	Number or amount.					Per cent of increase. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	8,479	8,926	9,242	4,552	3,932	-8.3	-5.0	-3.4	103.0	15.8
Persons engaged in the industry.....	31,506	25,865	22,604	(²)	(²)	39.4	21.8	14.4	.....	.....
Proprietors and firm members.....	8,019	6,801	6,987	(²)	(²)	14.8	17.9	-2.7	.....	.....
Salaried employees.....	5,056	3,507	2,818	(²)	(²)	79.4	44.2	24.4	.....	.....
Wage earners (average number).....	18,431	15,557	12,799	12,219	7,903	44.0	18.5	21.5	4.7	(²)
Primary horsepower.....	101,340	93,845	88,062	25,526	(²)	15.1	8.0	6.6	245.0	.....
Capital.....	\$71,283,615	\$47,255,556	\$36,303,164	\$16,016,573	\$9,604,803	96.4	50.8	30.2	126.7	66.8
Expenses.....	258,698,374	156,783,579	117,473,263	55,749,260	(²)	120.2	65.0	33.5	110.7	.....
Services.....	14,671,932	9,789,034	7,057,273	5,116,005	1,546,495	107.9	49.9	38.7	37.9	230.8
Salaries.....	3,590,624	1,376,097	911,712	(²)	(²)	293.8	160.9	50.9	.....	.....
Wages.....	11,081,308	8,412,937	6,145,561	(²)	(²)	80.3	31.7	36.9	.....	.....
Materials.....	235,546,064	142,920,277	108,841,200	49,819,301	18,363,579	116.4	64.8	31.3	118.5	171.3
Miscellaneous.....	8,480,378	4,074,268	1,574,790	813,954	(²)	438.5	108.1	153.7	93.5	.....
Value of products.....	274,557,718	168,182,789	130,783,349	60,635,705	25,742,510	109.9	63.2	28.6	115.7	135.5
Value added by manufacture (value of products less cost of materials).....	39,011,654	25,262,512	21,942,149	10,816,404	7,378,931	77.8	54.4	15.1	102.9	46.6

¹ A minus sign (-) denotes decrease. Where percentages are omitted comparable figures can not be given.

² Comparable figures not available.

³ Percentage omitted because figures are not strictly comparable.

Comparative statistics for the three branches of the industry: 1909 and 1904.—The more important statistics for the three branches of the industry (butter making, cheese making, and the manufacture of condensed milk), as reported at the censuses of 1909 and 1904, are given in Table 4. Complete statistics for these branches are not available for any earlier census.

The number of establishments manufacturing condensed milk as their only product or their product of chief value increased 67.9 per cent from 1904 to 1909, while the number of establishments engaged exclu-

sively or primarily in the manufacture of butter decreased 8.6 per cent, and the number making cheese as their chief or only product decreased 1.4 per cent. In value of products an increase is shown for each class of establishments, the percentages being 64.5 for the butter factories, 51.9 for the cheese factories, and 72 for the condensed milk factories.

It is probable that the greater percentage of increase shown for condensed milk factories as compared with butter and cheese factories is due largely to the fact that the condensed milk branch of the industry is of more recent development.

Table 4 ESTABLISHMENTS ENGAGED PRIMARILY IN THE MANUFACTURE OF—

	Butter.		Per cent of increase: ¹ 1904-1909	Cheese.		Per cent of increase: ¹ 1904-1909	Condensed milk.		Per cent of increase: ¹ 1904-1909
	Number or amount.			Number or amount.			Number or amount.		
	1909	1904		1909	1904		1909	1904	
Number of establishments.....	4,783	5,235	-8.6	3,560	3,610	-1.4	136	81	67.9
Persons engaged in the industry.....	19,380	16,044	20.8	7,164	6,118	17.1	4,962	3,703	34.0
Proprietors and firm members.....	3,855	3,497	10.2	4,148	3,289	26.1	16	15	6.7
Salaried employees.....	3,962	3,017	31.3	312	177	76.3	782	313	149.8
Wage earners (average number).....	11,563	9,530	21.3	2,704	2,652	2.0	4,164	3,375	23.4
Primary horsepower.....	78,123	77,523	0.8	11,638	10,366	12.3	11,588	5,956	94.6
Capital.....	\$43,017,467	\$30,080,419	43.0	\$9,028,906	\$6,232,182	44.9	\$19,237,242	\$10,942,955	75.8
Expenses.....	184,716,990	110,483,899	67.2	41,341,269	27,109,276	52.5	32,640,115	19,190,404	70.1
Services.....	9,691,151	6,381,941	51.9	1,825,270	1,530,602	19.3	3,155,511	1,876,491	68.2
Salaries.....	2,449,898	976,069	151.0	165,408	36,696	323.5	985,318	363,332	171.2
Wages.....	7,241,253	5,405,872	34.0	1,669,862	1,493,906	11.8	2,170,193	1,513,159	43.4
Materials.....	169,646,441	101,290,711	67.5	39,021,766	25,256,612	64.6	26,877,857	16,372,954	64.2
Miscellaneous.....	5,379,398	2,811,247	81.4	494,233	322,062	53.5	2,606,747	940,959	177.0
Value of products.....	194,999,198	118,520,999	64.5	44,263,177	29,138,100	51.9	35,285,343	20,523,690	72.0
Value added by manufacture (value of products less cost of materials).....	25,352,757	17,230,288	47.1	5,241,411	3,881,488	35.0	8,417,486	4,150,736	102.8

¹ A minus sign (-) denotes decrease.

Table 5 shows the total quantity of butter and cheese produced in the factories of the butter, cheese, and condensed milk industry and on farms in 1909 and 1899.

Table 5 PRODUCTION (POUNDS).

PRODUCT.	1909		1899		Per cent of total.	
	1909	1899	Per cent of total.			
			1909	1899		
Butter	1,619,415,263	1,491,762,602	100.0	100.0		
Factory product.....	624,764,653	420,126,546	38.6	28.2		
Farm product.....	994,650,610	1,071,636,056	61.4	71.8		
Cheese	320,532,181	298,344,842	100.0	100.0		
Factory product.....	311,126,317	281,972,324	97.1	94.5		
Farm product.....	9,405,864	16,372,518	2.9	5.5		

¹ In addition, 2,381,212 pounds of butter were produced in establishments engaged primarily in the manufacture of products other than butter, cheese, or condensed milk.

² In addition, 49,413 pounds of cheese were produced in establishments engaged primarily in the manufacture of products other than butter, cheese, or condensed milk.

In 1909 the combined production of butter in the factories of the butter, cheese, and condensed milk industry and on farms, in the United States, amounted to 1,619,415,263 pounds, an increase of 127,662,661 pounds, or 8.6 per cent over the production in 1899. During the decade the output of the factories increased 204,638,107 pounds, or 48.7 per cent, and the production on farms decreased 76,975,446 pounds, or 7.2 per cent.¹ At both censuses the production of butter on farms greatly exceeded the factory output, but the proportion which it formed of the combined total decreased from 71.8 per cent in 1899 to 61.4 per cent in 1909.

The quantity of cheese produced in the United States in the factories of the industry and on farms during 1909 amounted to 320,532,181 pounds, an

¹ It is possible that the comparison of farm production of butter for the two censuses is misleading. The figures published for 1899 included certain estimated quantities to cover the production of farms with incomplete reports, but no such estimates were made for 1909, the figures representing only the quantities actually reported.

increase of 22,187,539 pounds, or 7.4 per cent, over the production in 1899. The production in the factories engaged in the industry increased 29,153,993 pounds, or 10.3 per cent, between 1899 and 1909, and the production on farms decreased 6,966,454 pounds, or 42.6 per cent. At both censuses the quantity made in factories was many times greater than the quantity made on farms, and the proportion which it formed of the combined total increased from 94.5 per cent in 1899 to 97.1 per cent in 1909.

Summary, by states.—The butter, cheese, and condensed milk industry as a whole is well distributed throughout the country, with establishments in 43 of the 48 states. Table 6 presents the more important statistics for the industry by states, the states being arranged according to the value of products reported for 1909.

The diagram on the following page shows graphically the value of products reported for the leading states in 1909 and 1899, and the map the value of products reported for each state in 1909.

In determining the rank of the states, as shown in Table 6, all states are considered, regardless of whether or not they are shown separately in the table; hence some omissions occur in the several series of numbers indicating rank, as certain states included under "all other states" held a higher rank in some items than some of the states for which separate figures are given.

In 1909 Wisconsin was the most important state in the combined industry as measured by value of products, having displaced New York, which had previously ranked first. In average number of wage earners and value added by manufacture, however, New York still held first place in 1909 and Wisconsin ranked second, but the percentages of increase for the decade in these items, as well as in the value of products, were less for New York than for Wisconsin. Iowa ranked third as regards value of products in 1909. Minnesota, which shows an increase of 96.5 per

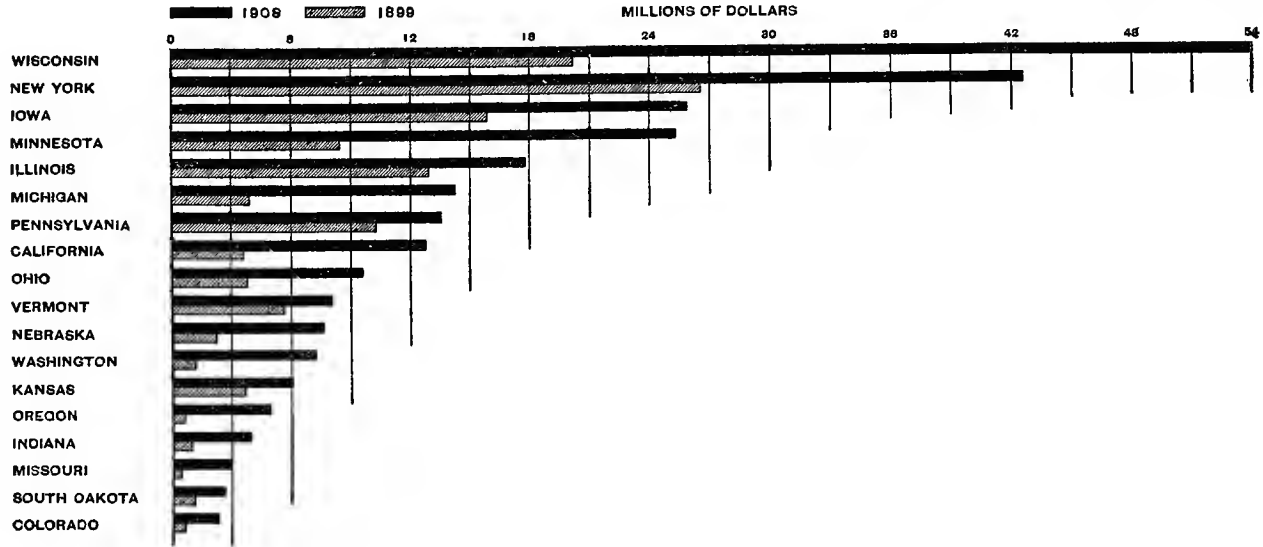
MANUFACTURES.

cent in value of products for the five-year period, advanced from fifth place in 1904 to fourth in 1909, having exchanged positions with Illinois, which shows a gain of only 34.1 per cent for this period.

Among the 13 states which reported products for 1909 valued at more than \$5,000,000, the following show very large percentages of increase in value of products for the decade 1899-1909: Washington (511),

Michigan (264.6), California (256.2), Nebraska (240.8), Minnesota (198.2), Wisconsin (167.6), and Ohio (154.4). Much higher percentages are shown for a number of other states, most of which, however, reported only a small proportion of the total value of products even in 1909. The states showing the highest percentages of increase were North Dakota (743.4), Oregon (670), Idaho (662.1), and Missouri (585).

BUTTER, CHEESE, AND CONDENSED MILK—VALUE OF PRODUCTS, FOR LEADING STATES: 1909 AND 1899.



BUTTER, CHEESE, AND CONDENSED MILK—VALUE OF PRODUCTS, BY STATES: 1909.

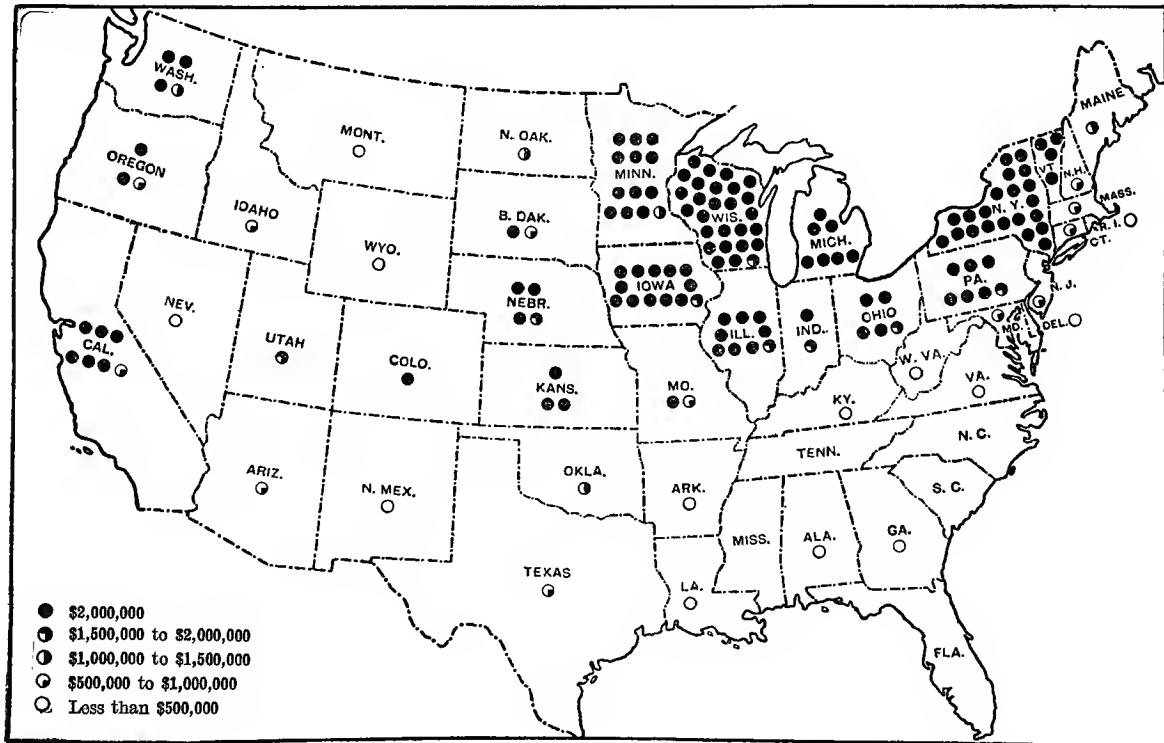


Table 6

BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

STATE.	Number of establishments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹											
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners.			Value of products.			Value added by manufacture.		
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States..	8,478	18,431	100.0			\$274,557,718	100.0			\$39,011,854	100.0			44.0	18.5	21.5	109.9	63.2	28.6	77.8	54.4	15.1
Wisconsin	2,630	2,863	15.5	2	2	53,843,249	19.6	1	2	5,837,619	15.0	2	2	60.8	24.6	23.1	187.6	79.5	49.1	67.0	62.6	2.7
New York	1,552	2,866	15.5	1	1	42,458,345	15.5	2	1	6,297,278	16.1	1	1	17.5	-0.1	17.6	59.9	36.7	16.9	54.7	48.0	4.5
Iowa	512	1,231	6.7	4	5	25,849,866	9.4	3	3	3,008,236	7.7	4	4	8.6		63.1						
Minnesota	784	1,184	6.4	5	6	25,287,462	9.2	4	5	2,579,989	6.6	5	6	60.0	13.7	40.7	198.2	96.5	51.8	99.8	49.0	34.1
Illinois	295	1,732	9.4	3	3	17,798,278	6.5	5	4	3,531,357	9.1	3	3	16.8	-0.2	17.0	38.2	34.1	3.1	31.8	37.5	-4.2
Michigan	435	1,073	5.8	7	7	14,287,499	5.2	6	7	1,910,697	4.9	7	8	113.3	22.6	74.0	264.6	74.0	109.5	196.1	61.6	83.3
Pennsylvania	536	1,177	6.4	6	4	13,544,065	4.9	7	6	1,869,856	4.8	8	5	20.6	-3.4	24.8	51.0	17.0	12.5	54.7	18.5	22.0
California	161	597	3.2	10	8	12,760,670	4.6	8	8	1,620,970	4.2	9	7	48.5	-1.0	50.0	256.2	63.2	118.3	169.3	19.1	126.1
Ohio	325	1,067	5.8	8	9	9,689,670	3.5	9	10	2,004,234	5.1	6	9	174.3	118.6	25.4	154.4	111.0	20.6	165.9	132.1	14.6
Vermont	186	519	2.8	11	10	8,112,239	3.0	10	9	1,056,425	2.7	13	11	-0.6			43.4					
Nebraska	37	383	2.1	14	13	7,681,272	2.8	11	12	1,246,526	3.2	11	12	15.0	51.4	-24.0	240.8	130.9	47.6	211.5	90.5	63.5
Washington	97	735	4.0	9	12	7,271,047	2.7	12	13	1,594,856	4.1	10	13	403.4	96.5	156.2	511.0	142.9	151.5	518.2	165.4	132.9
Kansas	60	348	1.9	15	11	6,070,634	2.2	13	11	1,120,121	2.9	12	10	-11.9	-15.9	4.8	66.2	53.9	8.0	89.5	62.3	16.8
Oregon	95	420	2.3	13	15	4,920,462	1.8	14	15	968,242	2.5	14	14				670.0					
Indiana	132	488	2.6	12	14	3,958,600	1.4	15	16	762,469	2.0	15	16	313.6			325.7					
Missouri	56	159	0.9	18	17	2,958,818	1.1	16	19	459,802	1.2	16	17		7.4		585.0	125.2	204.2	346.6	63.7	172.8
South Dakota	95	139	0.8	19	16	2,685,511	1.0	17	14	377,478	1.0	18	15	-6.1	-27.6	29.7	124.0	23.0	82.1	94.8	8.0	80.4
Colorado	39	210	1.1	17	20	2,339,765	0.9	18	18	416,163	1.1	17	18				278.6					
Utah	37	214	1.2	16	18	1,971,031	0.7	19	20	358,079	0.9	19	20	34.6			176.0					
Maine	29	96	0.5	22	19	1,301,027	0.5	20	17	203,017	0.5	22	19	-40.7			-24.7					
Oklahoma	19	62	0.3	26	32	1,149,545	0.4	21	31	221,245	0.6	20	32									
North Dakota	68	62	0.3	26	25	1,029,135	0.4	22	24	137,806	0.3	24	26				743.4	83.1	360.7			
Idaho	18	118	0.6	20	30	834,066	0.3	23	29	203,475	0.5	21	29				662.1	414.0	48.3			
New Hampshire	29	50	0.3	29	21	807,164	0.3	24	21	98,599	0.3	30	21	-58.0			-45.0					
New Jersey	20	73	0.4	24	26	793,423	0.3	25	25	123,099	0.3	27	24				30.0					
Connecticut	30	105	0.6	21	22	745,450	0.3	26	23	122,338	0.3	28	22	-36.7			-42.8	-31.9	-8.6	-25.5	-42.5	-15.9
Massachusetts	24	56	0.3	28	24	664,119	0.2	27	22	115,874	0.3	29	25				-44.6	-24.3	-26.8			
Texas	36	84	0.5	23	34	680,432	0.2	28	33	130,730	0.3	25	34									
Maryland	44	69	0.4	25	23	653,702	0.2	29	24	129,768	0.3	26	23	-38.9			-29.2	-5.8	26.0	-25.2	-4.4	8.3
Arizona	11	58	0.3	27	27	538,427	0.2	30	26	150,337	0.4	23	27				263.5	101.5	80.4			
Montana	20	29	0.2	31		418,920	0.2	31		64,747	0.2	32										
Nevada	9	16	0.1	33	33	325,755	0.1	32	28	36,882	0.1	35	31				120.3	65.5	33.1			
Kentucky	13	56	0.3	28	31	275,389	0.1	33	32	79,990	0.2	31	30									
Wyoming	4	20	0.1	32	32	268,862	0.1	34	30	57,542	0.1	33	33									
Delaware	10	32	0.2	30	28	263,691	0.1	35	27	52,533	0.1	34	28				4.3					
Arkansas	9	13	0.1	34	35	131,235	(?)	36	36	25,859	0.1	36	37									
Virginia	11	16	0.1	33	36	67,457	(?)	37	37	13,637	(?)	37	36									
Georgia	4	4	(?)	35	29	23,171	(?)	39	35	4,752	(?)	39	35									
All other states	7	7	(?)			68,265	(?)			18,608	(?)											

¹ Percentages are based on figures in Table 26. A minus sign (-) denotes decrease. Percentages are not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparable figures can not be given without disclosing individual operations.
² Less than one-tenth of 1 per cent.

Persons engaged in the industry.—Table 7 shows for 1909 the number of persons engaged in the butter, cheese, and condensed milk industry as a whole and in each of the three branches, classified according to occupational status, sex, and age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the industry in 1909 was 31,506, of whom 19,380 were reported by the butter factories, 7,164 by the cheese factories, and 4,962 by the condensed milk factories. Of the total number of persons engaged in the combined industry, 18,431, or 58.5 per cent, were wage earners; 10,480, or 33.3 per cent, were proprietors and officials; and 2,595, or 8.2 per cent, were clerks or other subordinate salaried

employees. Of the total number, 29,095, or 92.3 per cent, were males, and 2,411, or 7.7 per cent, females.

The average number of female wage earners employed in 1909 was 1,420, of whom 987, or 69.5 per cent, were in the condensed milk factories. Females formed 23.7 per cent of the total number of wage earners in this branch of the industry, as compared with 3.2 per cent in the butter factories and 2.2 per cent in the cheese factories.

The average number of wage earners employed in the industry, by states, is given in Table 26 for 1909, 1904, and 1899. The distribution by age and sex of the average number of wage earners employed during the year 1909 is not shown for the individual states, but Table 27 gives, by states, such a distribution of the number employed on December 15, or the nearest representative day.

Table 7
BRANCH OF INDUSTRY AND CLASS OF PERSONS.

	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
Butter, cheese, and condensed milk.....	31,506	29,085	2,411
Proprietors and officials.....	10,480	10,336	144
Proprietors and firm members.....	8,019	7,901	118
Salaried officers of corporations.....	1,032	1,014	18
Superintendents and managers.....	1,429	1,421	8
Clerks.....	2,595	1,748	847
Wage earners (average number).....	18,431	17,011	1,420
16 years of age and over.....	18,324	16,924	1,400
Under 16 years of age.....	107	87	20
Butter.....	19,380	18,244	1,136
Proprietors and officials.....	5,966	5,883	83
Proprietors and firm members.....	3,855	3,796	59
Salaried officers of corporations.....	905	889	16
Superintendents and managers.....	1,206	1,198	8
Clerks.....	1,851	1,172	679
Wage earners (average number).....	11,563	11,189	374
16 years of age and over.....	11,523	11,154	369
Under 16 years of age.....	40	35	5
Cheese.....	7,164	7,018	146
Proprietors and officials.....	4,299	4,238	61
Proprietors and firm members.....	4,148	4,089	59
Salaried officers of corporations.....	64	62	2
Superintendents and managers.....	87	87	.....
Clerks.....	161	135	26
Wage earners (average number).....	2,704	2,645	59
16 years of age and over.....	2,686	2,627	59
Under 16 years of age.....	18	18	.....
Condensed milk.....	4,962	3,833	1,129
Proprietors and officials.....	215	215	.....
Proprietors and firm members.....	16	16	.....
Salaried officers of corporations.....	63	63	.....
Superintendents and managers.....	136	136	.....
Clerks.....	583	441	142
Wage earners (average number).....	4,164	3,177	987
16 years of age and over.....	4,115	3,143	972
Under 16 years of age.....	49	34	15

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that shown at the census of 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 8.

Table 8
PERSONS ENGAGED IN THE BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

CLASS.	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	31,506	100.0	25,865	100.0	21.8
Proprietors and firm members.....	8,019	25.5	6,801	26.3	17.9
Salaried employees.....	5,056	16.0	3,507	13.6	44.2
Wage earners (average number).....	18,431	58.5	15,557	60.1	18.5

Salaried employees show the greatest percentage of increase, and constitute the only class forming a larger proportion of the total in 1909 than in 1904.

Table 9 shows the average number of wage earners in the industry, distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. (See Introduction.)

Table 9
AVERAGE NUMBER OF WAGE EARNERS IN THE BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	18,431	100.0	15,557	100.0	12,799	100.0
16 years of age and over.....	18,324	99.4	15,441	99.3	12,678	99.1
Male.....	16,924	91.8	14,036	90.2	11,637	90.9
Female.....	1,400	7.6	1,405	9.0	1,041	8.1
Under 16 years of age.....	107	0.6	116	0.7	121	0.9

In 1909 the proportion of males 16 years of age and over in the average number of wage earners was somewhat greater than in 1904 or 1899, while the proportions of females 16 years of age and over and of children under 16 years of age were slightly lower than in the two earlier years.

Wage earners employed, by months.—Table 10 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 11 states in which an average of 500 or more wage earners were employed during the year.

Table 10
WAGE EARNERS IN THE BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		United States.....	18,431	15,121	15,239	15,378	18,059	20,262	21,313	21,392	20,934	20,065	18,902	17,571	16,343
California.....	597	<i>625</i>	529	561	604	632	629	624	622	612	608	603	613
Illinois.....	1,732	1,661	1,685	1,710	1,739	1,818	1,867	1,813	1,770	1,710	1,708	1,673	1,687
Iowa.....	1,231	<i>1,066</i>	1,069	1,084	1,174	1,285	1,405	1,453	1,427	1,345	1,225	1,140	1,084
Michigan.....	1,073	966	<i>949</i>	968	1,060	1,139	1,179	1,179	1,161	1,123	1,060	1,055	1,028
Minnesota.....	1,184	<i>1,085</i>	1,031	1,048	1,133	1,255	1,356	1,372	1,342	1,268	1,178	1,115	1,083
New York.....	2,866	<i>2,065</i>	2,071	2,259	2,972	3,409	3,588	3,531	3,397	3,214	3,038	2,636	2,223
Ohio.....	1,067	878	<i>876</i>	885	1,002	1,189	1,215	1,222	1,232	1,229	1,150	1,001	925
Pennsylvania.....	1,177	1,035	<i>1,024</i>	1,039	1,168	1,283	1,335	1,336	1,316	1,258	1,191	1,099	1,040
Vermont.....	519	429	<i>428</i>	451	507	553	582	620	592	576	536	485	460
Washington.....	735	603	657	706	764	843	884	838	783	762	703	659	618
Wisconsin.....	2,863	<i>2,015</i>	2,030	2,257	2,671	3,254	3,413	3,443	3,416	3,303	3,130	2,918	2,494

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the industry during any month of 1909 was 21,392, in July, and the smallest number 15,121, in January, the minimum number being equal to 70.7 per cent of the maximum. The period of greatest employment in the industry is naturally in the summer months, when milk and cream are most plentiful. In 9 of the 11 leading states for which figures are given in Table 10 the maximum number of wage earners was reported either for June or for July. In 1904 the maximum number, 18,768, were employed in July, and the minimum number, 12,089, in January, the minimum being equal to 64.4 per cent of the maximum. The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for 38 states in Table 27.

Prevailing hours of labor.—In Table 11 the wage earners in the butter, cheese, and condensed milk factories in 1909 have been classified according to the hours of labor prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in the establishment, even though some employees worked a greater or less number of hours. Separate figures are given for each state in which an average of 500 or more wage earners were employed.

Table 11

AVERAGE NUMBER OF WAGE EARNERS IN THE BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	18,431	1,783	228	1,020	1,254	6,379	6,825	932
California.....	597	58	11	56	85	120	244	23
Illinois.....	1,732	131	9	59	40	495	992	6
Iowa.....	1,231	173	12	123	60	597	179	87
Michigan.....	1,073	145	13	27	44	750	68	26
Minnesota.....	1,124	245	4	114	40	692	43	46
New York.....	2,866	169	63	98	398	608	1,436	94
Ohio.....	1,067	64	9	27	58	401	470	38
Pennsylvania.....	1,177	131	49	75	156	337	411	18
Vermont.....	519	31	14	28	29	134	250	33
Washington.....	735	31	.....	87	16	181	415	5
Wisconsin.....	2,863	251	22	68	192	766	1,103	461

Of the wage earners employed in the industry in 1909, more than three-fourths (76.7 per cent) were employed in establishments where the prevailing hours of labor per week were 60 or more. Only 5.1 per cent of the total number were employed in establishments where the prevailing hours were 72 or over, however; and 9.7 per cent were in establishments where the prevailing hours were 48 or less per week. Of the seven groups into which the establishments in the industry are here classified, the one made up of establishments where the prevailing hours of labor per week were between 60 and 72 employed the largest

number of wage earners (6,825, or 37 per cent of the total number), though the group comprising establishments where the prevailing hours were 60 per week employed almost as many (6,379, or 34.6 per cent of the total). The group in which the prevailing hours per week were between 60 and 72 was the most important in point of number of wage earners employed in 8 of the 11 states for which figures are given in the table.

Character of ownership.—Table 12 presents data with respect to the character of ownership, or legal organization, of the establishments in the butter, cheese, and condensed milk industry for 1909 and 1904.

Table 12

BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

CHARACTER OF OWNERSHIP.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
	Total.....	8,479	8,928	\$274,557,718	$168,182,789
Individual.....	3,370	3,817	61,432,341	43,919,439
Firm.....	1,021	1,291	26,997,945	22,653,536
Corporation.....	1,313	1,385	113,493,555	61,309,538
Cooperative association.....	¹ 2,775	2,433	¹ 72,633,877	40,300,276
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	39.7	42.8	22.4	26.1
Firm.....	12.0	14.5	9.8	13.5
Corporation.....	15.5	15.5	41.3	36.5
Cooperative association.....	32.7	27.3	26.5	24.0

¹ Includes 1 establishment owned by the state of Wisconsin.

Of the total number of establishments reported for the industry, both in 1909 and in 1904, 15.5 per cent were under corporate ownership. While corporations thus controlled a comparatively small percentage of the total number of establishments, the value of the products of these establishments represented 41.3 per cent of the total for the industry in 1909 and 36.5 per cent in 1904. It is probable that in the case of some of the establishments for which the cooperative form of ownership was reported the controlling association was actually incorporated, but it is impracticable to determine the number of corporations thus included among the cooperative associations. Cooperative associations, as reported, controlled 32.7 per cent of the establishments engaged in the industry in 1909, as compared with 27.3 per cent in 1904, and reported 26.5 per cent of the total value of products in 1909 and 24 per cent in 1904. This form of ownership has increased in importance in those branches of the industry devoted to the manufacture of butter and cheese, but no cooperative associations were reported for the condensed milk branch of the industry. (See Table 14.)

Establishments controlled by firms formed only 12 per cent of the total number in the industry in 1909, and reported only 9.8 per cent of the total value of products for that year. The largest group of establishments numerically, both in 1909 and in 1904, was that of establishments under individual ownership, but these contributed in 1909 a smaller percentage of

the total value of products than those controlled either by corporations or by cooperative associations and in 1904 a smaller percentage than those controlled by corporations. Between 1904 and 1909 there was a decline in the relative importance of establishments under individual and firm ownership.

Table 13 distributes the establishments in the industry in 1909 according to character of ownership, and shows also for each group the average number of wage earners employed, the value of products, and the value added by manufacture, for each state which employed an average of more than 500 wage earners.

STATE.	Number of establishments owned by—				Wage earners in establishments owned by—				Value of products of establishments owned by—				Value added by manufacture in establishments owned by—			
	Individuals.	Firms.	Corporations.	Co-operative associations.	Individuals.	Firms.	Corporations.	Co-operative associations.	Individuals.	Firms.	Corporations.	Co-operative associations.	Individuals.	Firms.	Corporations.	Co-operative associations.
United States..	3,370	1,021	1,313	2,775	3,418	1,791	9,299	3,923	\$61,432,341	\$26,997,945	\$113,493,555	\$72,633,877	\$7,097,166	\$3,578,677	\$20,936,655	\$7,399,156
California.....	52	28	55	26	155	51	313	78	2,263,798	994,872	7,356,944	2,145,056	351,602	153,344	852,541	263,483
Illinois.....	90	43	84	78	101	83	1,447	101	1,574,475	1,384,527	13,200,456	1,638,820	206,046	177,776	2,941,488	206,047
Iowa.....	105	51	58	298	202	134	407	488	3,371,872	2,239,808	7,737,198	12,500,988	429,710	288,277	1,274,499	1,015,750
Michigan.....	131	84	118	102	189	157	518	209	2,986,902	2,512,295	5,531,195	3,257,107	374,495	335,324	888,520	312,358
Minnesota.....	150	33	46	555	192	34	165	793	4,592,276	946,236	3,957,931	15,791,019	527,638	99,111	446,190	1,507,050
New York.....	893	239	208	212	616	393	1,541	316	12,793,485	5,891,396	18,521,508	5,251,956	1,363,607	749,017	3,673,857	1,507,797
Ohio.....	87	53	72	113	163	89	701	114	1,592,131	1,144,155	5,874,514	1,078,870	271,005	148,102	1,413,458	171,669
Pennsylvania.....	276	102	52	106	354	242	440	141	4,570,716	2,539,499	4,105,119	2,328,731	507,585	365,769	713,125	223,196
Vermont.....	50	14	22	100	107	38	245	129	1,850,284	596,280	2,953,937	2,711,738	191,583	55,999	572,785	236,058
Washington.....	27	12	40	18	58	26	616	35	787,342	510,173	5,333,026	640,506	114,457	78,413	1,333,994	67,992
Wisconsin.....	1,242	236	283	1,869	769	293	808	1,993	19,332,700	5,056,410	10,438,592	19,015,547	1,737,532	565,050	1,550,258	1,984,779

¹ Includes statistics for 1 establishment under state ownership.

Of the entire number of wage earners reported in 1909 for the industry as a whole, 3,418, or 18.5 per cent of the total, were employed in establishments under individual ownership; 1,791, or 9.7 per cent, in those under firm ownership; 9,299, or 50.5 per cent, in those under corporate ownership; and 3,923, or 21.3 per cent, in those under cooperative ownership (including one state establishment). In 7 of the 11 states for which figures are shown establishments under corporate ownership reported a larger value of products than those under any other form of ownership; in 2 states (Iowa and Minnesota) cooperative establishments reported the largest value of products; and in 2 states (Pennsylvania and Wisconsin) establishments under individual ownership reported the largest amount. Establishments under corporate ownership reported the largest number of wage earners in 8 of the states, and those under cooperative ownership in 3.

Minnesota shows the largest proportion of the total number of establishments and value of products for establishments under cooperative ownership (70.8 per cent and 62.4 per cent, respectively), although Wisconsin shows a larger actual number of cooperative establishments, with a greater value of products. Wisconsin led in value of products for establishments under individual and cooperative ownership in 1909 and New York for those under firm and corporate ownership.

Table 14 presents statistics relating to character of ownership in 1909 for the three branches of the butter, cheese, and condensed milk industry.

Of the establishments in which butter was the product of chief value, those controlled by cooperative associations constituted the most numerous group, but those under corporate ownership reported the largest

proportion of the wage earners and of the total value of products. Among the cheese factories, establishments under individual ownership, and among the condensed milk factories, those under corporate ownership formed the most important class in respect to all the items shown in the table.

	Total.	ESTABLISHMENTS ENGAGED PRIMARILY IN THE MANUFACTURE OF—		
		Butter.	Cheese.	Condensed milk.
Number of establishments owned by—				
Individuals.....	3,370	1,330	2,035	5
Firms.....	1,021	599	418	4
Corporations.....	1,313	820	266	127
Cooperative associations ¹	2,775	1,934	841	.....
Wage earners in establishments owned by—				
Individuals.....	3,418	2,206	1,191	21
Firms.....	1,791	1,353	423	15
Corporations.....	9,299	4,778	393	4,128
Cooperative associations ¹	3,923	3,226	697	.....
Value of products of establishments owned by—				
Individuals.....	\$61,432,341	\$35,392,755	\$25,843,379	\$196,207
Firms.....	26,997,945	20,939,354	5,913,025	145,566
Corporations.....	113,493,555	74,597,498	3,942,487	34,953,570
Cooperative associations ¹	72,633,877	64,069,591	8,564,286	.....
Value added by manufacture in establishments owned by—				
Individuals.....	7,097,166	4,461,721	2,604,478	30,967
Firms.....	3,578,677	2,779,406	776,741	22,530
Corporations.....	20,936,655	11,936,958	635,708	8,363,989
Cooperative associations ¹	7,399,156	6,174,672	1,224,484	.....

¹ Includes figures for 1 butter factory under state ownership.

Establishments classified according to size.—Table 15 groups the establishments of the butter, cheese, and condensed milk industry, and of each of its three branches, according to the value of products per establishment in 1909, and shows for each group, for 1909 and 1904, the number of establishments and the value of products, together with the percentage of the respective totals represented by each group.

Table 15

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Butter, cheese, and condensed milk.....	8,479	8,926	\$274,557,718	\$168,182,789
Less than \$5,000.....	833	1,885	2,610,549	5,749,775
\$5,000 and less than \$20,000.....	4,262	4,953	49,557,062	52,719,903
\$20,000 and less than \$100,000.....	3,004	1,946	116,551,144	70,725,456
\$100,000 and less than \$1,000,000.....	371	¹ 142	93,905,110	¹ 38,987,655
\$1,000,000 and over.....	9	.....	11,933,853	.....
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	9.8	21.1	1.0	3.4
\$5,000 and less than \$20,000.....	50.3	55.5	18.0	31.3
\$20,000 and less than \$100,000.....	35.4	21.8	42.5	42.1
\$100,000 and less than \$1,000,000.....	4.4	¹ 1.6	34.2	¹ 23.2
\$1,000,000 and over.....	0.1	.....	4.3	.....
Butter.....	4,784	5,235	\$196,060,072	\$118,520,999
Less than \$5,000.....	302	702	893,459	1,984,697
\$5,000 and less than \$20,000.....	1,686	2,647	21,260,540	31,761,456
\$20,000 and less than \$100,000.....	2,511	1,795	101,615,135	65,181,261
\$100,000 and over.....	¹ 285	¹ 91	¹ 72,290,938	¹ 19,593,585
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	6.3	13.4	0.5	1.7
\$5,000 and less than \$20,000.....	35.2	50.6	10.8	26.8
\$20,000 and less than \$100,000.....	52.5	34.3	51.8	55.0
\$100,000 and over.....	16.0	¹ 1.7	¹ 36.9	¹ 16.5
Cheese.....	3,560	3,610	\$44,263,177	\$29,138,100
Less than \$5,000.....	628	1,183	1,708,110	3,765,078
\$5,000 and less than \$20,000.....	2,567	2,300	28,178,390	20,894,450
\$20,000 and less than \$100,000.....	458	123	12,744,219	3,900,407
\$100,000 and less than \$1,000,000.....	9	4	1,632,458	578,165
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	14.8	32.8	3.9	12.9
\$5,000 and less than \$20,000.....	72.1	63.7	63.7	71.7
\$20,000 and less than \$100,000.....	12.8	3.4	28.8	13.4
\$100,000 and less than \$1,000,000.....	0.3	0.1	3.7	2.0
Condensed milk.....	135	81	\$34,234,469	\$20,523,690
Less than \$5,000.....	3	.....	8,980	.....
\$5,000 and less than \$20,000.....	9	² 6	118,132	² 63,997
\$20,000 and less than \$100,000.....	37	28	2,191,790	1,643,788
\$100,000 and less than \$1,000,000.....	86	¹ 47	31,915,567	¹ 18,815,905
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	2.2	.....	(³)	.....
\$5,000 and less than \$20,000.....	6.7	7.4	0.3	0.3
\$20,000 and less than \$100,000.....	27.4	34.6	6.4	8.0
\$100,000 and less than \$1,000,000.....	63.7	¹ 58.0	93.2	191.7

¹ Includes the group "\$1,000,000 and over," to avoid disclosure of individual operations.

² Includes the group "less than \$5,000," to avoid disclosure of individual operations.

³ Less than one-tenth of 1 per cent.

Of the 8,479 establishments reported for 1909, only 9 had products valued at \$1,000,000 or over. In 1904 3 such establishments were reported, but their statistics could not be shown separately without disclosing individual operations. The value of products of the 9 establishments of this class in 1909 formed 4.3 per cent of the total for the industry, while the value of products of the 833 establishments reporting less than \$5,000 formed but 1 per cent of the total. The establishments having products valued at less than \$20,000 constituted more than one-half (60.1 per cent) of the total number reported, but the value of their products amounted to only 19 per cent of the total. The corresponding proportions for such establishments at the census of 1904 were 76.6 per cent and 34.7 per cent, respectively. Thus the greater part of the value of products of the industry was reported by establishments having products valued at \$20,000 or over, these establishments contributing 81 per cent of the total in 1909 and 65.3 per cent in 1904.

In the butter-making branch of the industry, establishments with products valued at less than \$20,000 reported only 11.3 per cent of the total value of products in 1909, while those with products valued at

\$100,000 or over reported 36.9 per cent. In 1904 the group of establishments first mentioned reported 28.4 per cent of the total value of products, and the group comprising establishments with products valued at \$100,000 or over reported only 16.5 per cent. In the cheese-making branch of the industry only a small part of the total value of products was reported by the very large establishments, and a very large proportion (67.6 per cent in 1909 and 84.6 per cent in 1904) was reported by establishments with products valued at less than \$20,000. In the condensed milk branch by far the greater part of the manufacturing was done in the large establishments, those having products valued at \$100,000 or over reporting 93.2 per cent of the total value of products in 1909 and 91.7 per cent in 1904.

The value of products per establishment in the industry as a whole increased from \$18,842 in 1904 to \$32,381 in 1909. There are decided differences among the three branches of the industry with respect to size of establishments. In 1909 the average value of products per establishment for those engaged chiefly in the manufacture of butter was \$40,980; for those engaged chiefly in the manufacture of cheese, \$12,433; and for those engaged chiefly in the manufacture of condensed milk, \$253,589. In 1904 these averages were \$22,640, \$8,071, and \$253,379, respectively.

In some respects, and especially from the standpoint of conditions under which persons engaged in the industry work, the best classification of establishments to bring out the feature of size is a classification according to the number of wage earners employed. Table 16 gives such a classification for the industry as a whole, showing not only the number of establishments falling into each group, but also the average number of wage earners employed in each class of establishments for the 11 states in which an average of 500 or more wage earners were employed in 1909.

Of the 8,479 establishments in the industry in 1909, 1,025, or 12.1 per cent, employed no wage earners; 6,992, or 82.5 per cent, employed from 1 to 5; and 340, or 4 per cent, from 6 to 20. Only 42 establishments reported more than 50 wage earners, and of these only 7 establishments reported more than 100, and none more than 250.

Of the total number of wage earners, 50.2 per cent were reported by establishments employing from 1 to 5 wage earners, 18.3 per cent by those employing from 6 to 20, 26.3 per cent by those employing from 21 to 100, and 5.1 per cent by those employing more than 100. The table shows that from the standpoint of employment the majority of the establishments in the industry as a whole in each of the states shown are small. Only four states had any establishments employing more than 100 wage earners, and of the wage earners employed in such establishments 59 per cent were in Illinois. In two states, Minnesota and Wisconsin, more than four-fifths of the wage earners (85.9 per cent and 82.4 per cent, respectively), were in establishments employing from 1 to 5 wage earners.

Table 16

BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY: 1909

STATE.	Total.		Establishments employing—										
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.
	Estab-lish-ments.	Wage earners (average number).	Estab-lish-ments.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.....	8,479	18,431	1,025	6,892	9,258	340	3,378	80	2,490	35	2,362	7	945
California.....	161	597	14	118	227	28	290	3	80	.....	.....	.....	.....
Illinois.....	295	1,732	29	232	348	16	162	9	301	5	363	4	558
Iowa.....	512	1,231	29	444	707	31	285	8	239	.....	.....	.....	.....
Michigan.....	435	1,073	27	378	607	25	267	3	90	2	109	.....	.....
Minnesota.....	784	1,184	41	728	1,017	13	111	2	56	.....	.....	.....	.....
New York.....	1,552	2,866	234	1,249	1,366	42	402	21	673	5	321	1	104
Ohio.....	325	1,067	27	266	329	24	249	3	82	4	289	1	118
Pennsylvania.....	536	1,177	79	425	645	25	247	5	137	2	148	.....	.....
Vermont.....	186	519	4	169	246	7	52	5	150	1	71	.....	.....
Washington.....	97	735	6	73	141	11	102	3	121	3	206	1	165
Wisconsin.....	2,630	2,863	447	2,144	2,359	34	285	3	104	2	115	.....	.....

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation, and consequently they can not properly be used for calculating profits. Facts of interest, however, may be brought out concerning the relative importance of the different classes of expenses which make up the total. As shown in Table 1, the expenses reported for 1909 amounted to \$258,698,374, distributed as follows: \$235,546,064, or 91.1 per cent, for cost of materials; \$11,081,308, or 4.3 per cent, for wages; \$3,590,624, or 1.4 per cent, for salaries; and \$8,480,378, or 3.3 per cent, for miscellaneous expenses, consisting of amounts paid for advertising, traveling expenses, ordinary repairs of buildings and machinery, taxes, insurance, and other sundry expenses not elsewhere included. The cost of milk and cream used for materials forms such a large proportion of the total expenses in the industry that there is relatively little variation in the proportions shown for the four items of expense in the different states.

Table 17 shows, in percentages, for the industry as a whole and for the three branches, the distribution of the reported expenses among the classes indicated.

BRANCH OF INDUSTRY.	PER CENT OF TOTAL EXPENSES REPORTED: 1909			
	Cost of materials.	Salaries.	Wages.	Miscellaneous expenses.
Total.....	91.1	1.4	4.3	3.3
Butter.....	91.8	1.3	3.9	2.9
Cheese.....	94.4	0.4	4.0	1.2
Condensed milk.....	82.3	3.0	6.6	8.0

There was very little difference in the proportions represented by the several classes of expenses between the butter factories and the cheese factories, although the percentage for cost of materials was slightly greater in the latter. In the manufacture of condensed milk, however, the proportion for cost of

materials was much less and that for the other items correspondingly greater.

Engines and power.—The amount of power used in the butter, cheese, and condensed milk industry was first reported at the census of 1889. Table 2 shows that the total horsepower used in the industry as a whole increased from 25,526 in 1889 to 101,349 in 1909. Table 18 shows for the industry the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current), and their total horsepower, at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments reporting.

Table 18

BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	7,775	7,528	8,115	101,349	93,845	88,062	100.0	100.0	100.0
Owned.....	7,133	7,395	8,115	95,771	92,134	87,429	94.5	98.2	99.3
Steam.....	6,555	7,031	7,868	90,802	88,677	84,666	89.6	94.5	96.1
Gas.....	509	277	137	3,373	1,800	825	3.3	1.9	0.9
Water wheels.....	60	79	110	1,403	1,380	1,594	1.4	1.5	1.8
Water motors.....	9	8	(¹)	62	31	(²)	0.1	(²)	.....
Other.....	.....	.....	.....	131	246	344	0.1	0.3	0.4
Rented.....	642	133	.....	5,578	1,711	633	5.5	1.8	0.7
Electric.....	642	133	(¹)	5,366	1,597	316	5.3	1.7	0.4
Other.....	.....	.....	.....	212	114	317	0.2	0.1	0.4
Electric motors.....	1,246	291	41	8,276	2,378	627	100.0	100.0	100.0
Run by current generated by establishment.....	604	158	41	2,910	781	311	35.2	32.8	49.6
Run by rented power.....	642	133	(¹)	5,366	1,597	316	64.8	67.2	50.4

¹ Not reported² Less than one-tenth of 1 per cent.

The total primary power used in the industry increased 13,287 horsepower, or 15.1 per cent, between 1899 and 1909. The greater part of the increase was in steam and rented electric power, although there

was also a large increase in the power reported for gas and other internal combustion engines.

In 1909, as in 1904 and 1899, steam power formed the major part of the primary power used in the industry, but its relative importance has decreased considerably since 1899. In that year steam power formed 96.1 per cent of the total primary power, but in 1909 the percentage was only 89.6. Rented electric power, on the other hand, represented 5.3 per cent of the total in 1909, as compared with three-tenths of 1 per cent in 1899, and the power of gas and other internal combustion engines also shows a marked increase in

relative importance. Although the industry is not one that requires a large amount of power, the average per establishment increased from 9.5 horsepower in 1899 to 10.5 horsepower in 1904 and 12 horsepower in 1909.

The number of motors used for the distribution of power by means of electric current generated in the establishment increased from 41 in 1899 to 604 in 1909, and their horsepower from 311 to 2,910.

Table 19 shows the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in 1909, for 11 leading states.

Table 19

BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY: 1909

STATE.	Primary horsepower.		Owned by establishments reporting.							Rented.		Electric horsepower.		Fuel used.					
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec- tric.	Oth- er.	Total, rented and generated by estab- lish- ment reporting.	Gener- ated in the estab- lish- ment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, includ- ing gasoline (barrels).	Gas (1,000 feet).		
												Anthra- cite (long tons).	Bitumi- nous (short tons).						
United States....	6,420	101,349	95,771	90,802	3,373	1,465	131	5,398	212	8,276	2,910	47,344	588,169	1,069	182,587	94,325	215,318		
California.....	145	2,496	1,596	1,389	207	.....	.....	880	20	906	26	65	347	.....	7,269	27,119	828
Illinois.....	266	6,753	6,567	6,444	73	.....	50	186	.....	625	439	94	111,896	.....	718	711	78
Iowa.....	507	8,911	8,519	8,181	218	120	.....	354	38	438	84	192	66,615	168	2,312	292	.....	
Michigan.....	336	4,776	4,624	4,563	47	14	.....	144	8	286	142	462	41,585	513	5,003	239	.....	
Minnesota.....	769	11,874	11,227	10,821	406	.....	.....	647	.....	711	64	412	38,871	5	22,520	556	100
New York.....	1,044	16,629	16,390	15,263	469	626	32	239	.....	648	409	23,216	99,204	59	33,808	1,236	13,266	
Ohio.....	191	3,386	3,296	2,725	472	65	34	86	4	512	426	222	31,305	23	2,370	19	43,347		
Pennsylvania.....	464	7,613	7,497	7,247	126	124	.....	51	65	233	182	15,384	31,957	.....	4,914	248	12,870
Vermont.....	151	2,944	2,807	2,402	74	331	.....	127	10	379	252	3,789	6,380	.....	7,138	167	.....	
Washington.....	92	2,203	1,807	1,772	11	24	.....	396	.....	714	318	.....	10,151	78	10,846	22,018	.....	
Wisconsin.....	1,560	16,467	16,131	15,258	812	58	3	336	.....	356	20	1,085	71,557	149	67,455	1,014	.....	
All other states.....	895	17,297	15,310	14,737	458	103	12	1,920	67	2,468	548	2,423	78,301	74	18,234	40,706	144,837		

The states from which the largest amounts of power were reported were New York, Wisconsin, Minnesota, Iowa, Pennsylvania, and Illinois, the total for these six states amounting to 68,247 horsepower, or 67.3 per cent of the aggregate for the United States. In amount of steam power used in 1909, New York and Wisconsin led, with 15,263 and 15,258 horsepower, respectively. Gas engines were in general use, Wisconsin reporting the largest amount of power of this class—812 horsepower, or 24.1 per cent of the total. In the use of rented electric power, California ranked first, with 880 horsepower, or 16.4 per cent of the total. Water power is but little used in the industry. New

York and Vermont together reported 957 horsepower of this character, or 65.3 per cent of the total.

Fuel consumed.—The amount expended for fuel and rent of power in 1909 was \$2,771,983, which is distributed by states in Table 27. Bituminous coal was the principal kind of fuel used in the industry, the quantity consumed during 1909 amounting to 588,169 tons. Gas and oil are also used to a considerable extent, as well as wood, of which 182,587 cords were reported for 1909. The greatest quantity of gas was reported for Ohio, the largest amount of oil for California, and the greatest quantity of wood for Wisconsin.

SPECIAL STATISTICS OF MATERIALS AND PRODUCTS.

The special schedule used in collecting the statistics for the butter, cheese, and condensed milk industry included inquiries as to the quantity and cost of the milk and cream used during the year and the quantity and value of the various products. In the case of cooperative factories, or those where the materials were not purchased but were handled on fixed terms,

the cost was based on the prices paid for similar materials by other factories in the vicinity.

Quantity and value of principal materials used, by states: 1909.—In Table 20 the quantity and cost of the principal materials used in the manufacture of butter, cheese, and condensed milk in 1909 are shown, by states.

BUTTER, CHEESE, AND CONDENSED MILK—PRINCIPAL MATERIALS USED, BY STATES: 1909.

Table 20 STATE.	MILK.		CREAM.		SKIMMED MILK.		SUGAR.	
	Quantity (pounds).	Cost.	Quantity (pounds).	Cost.	Quantity (pounds).	Cost.	Quantity (pounds).	Cost.
United States.....	9,888,727,303	\$118,675,613	1,406,143,908	\$95,025,507	56,974,760	\$110,469	78,457,978	\$3,674,174
Arizona.....	24,859,984	263,670	985,589	71,705				
Arkansas.....	5,677,492	64,797	430,816	29,891				
California.....	206,222,329	2,748,287	101,128,644	7,985,666				
Colorado.....	111,072,584	1,185,956	6,661,696	523,010	9,234,200	9,096	21,200	1,145
Connecticut.....	2,510,047	34,045	8,341,916	566,408	49,000	244		
Delaware.....	13,855,524	150,295	508,316	45,123				
Georgia.....	1,658,999	17,334						
Idaho.....	4,032,821	52,640	8,319,958	598,092	24,000	150	25,400	1,663
Illinois.....	707,013,502	7,922,432	44,565,553	3,043,052	10,218,353	19,224	19,660,937	970,183
Indiana.....	119,475,669	1,295,916	27,098,202	1,724,887			149,196	7,795
Iowa.....	474,821,988	5,300,006	243,619,568	16,100,578	208,240	1,133	399,162	19,526
Kansas.....	119,462,779	1,093,221	47,340,211	3,021,906	1,145,000	3,543	29,460	4,096
Kentucky.....	8,134,799	96,285	786,211	55,151	240,000	1,950		
Maine.....	32,641,490	463,251	5,330,125	389,228			843,530	39,055
Maryland.....	35,492,856	428,128	962,936	56,012	180,000	72	125,578	6,223
Massachusetts.....	10,042,147	115,708	5,981,975	413,818				
Michigan.....	478,008,911	5,609,182	83,241,827	5,588,744	960,670	3,455	9,939,033	484,740
Minnesota.....	645,597,385	7,331,676	236,861,608	14,366,509	3,695,976	8,640	4,100	532
Missouri.....	35,695,793	354,845	29,484,057	1,953,851	10,003,200	4,758	9,433	488
Montana.....	9,596,678	112,836	2,960,485	224,917			4,500	600
Nebraska.....	167,861,401	1,587,018	56,010,365	3,315,938			10,000	600
Nevada.....	2,323,255	25,521	243,194	23,194				
New Hampshire.....	28,483,364	406,162	2,733,412	271,724			5,000	250
New Jersey.....	42,579,133	594,500	3,640	216	250,000	750	232,680	12,212
New York.....	2,422,727,788	30,606,583	17,842,320	1,233,461	1,075,100	1,625	34,166,665	1,553,025
North Dakota.....	10,312,430	105,618	10,803,418	723,538	57,600	360	1,900	119
Ohio.....	344,686,001	4,120,473	41,291,271	2,823,140	444,000	956	184,400	9,254
Oklahoma.....	53,735,418	521,147	5,467,267	338,532			7,550	384
Oregon.....	1,482,191	14,821	23,084,616	1,798,315			133,900	7,604
Pennsylvania.....	787,448,479	9,899,471	16,061,716	1,018,160	13,577,181	38,133	3,440,019	163,265
South Dakota.....	18,050,853	194,392	29,106,828	1,976,016			4,582	547
Texas.....	5,496,798	63,249	9,376,412	438,260				42
Utah.....	64,553,492	793,088	9,032,800	664,041			41,600	2,704
Vermont.....	240,020,144	2,904,316	48,343,294	3,622,642	1,013,738	5,095	3,071,061	164,881
Virginia.....	3,880,138	41,402	119,305	7,898				
Washington.....	150,544,931	2,228,688	29,415,008	2,478,610			6,700	594
Wisconsin.....	2,366,154,761	28,357,656	246,838,822	17,165,904	4,598,502	11,285	5,940,392	222,547
Wyoming.....	6,689,937	65,612	2,409,634	127,758				
All other states ¹	3,527,033	38,016	128,291	9,612				

¹ "All other states" embrace the following, with establishments as indicated: Alabama, 1; Louisiana, 1; New Mexico, 2; Rhode Island, 1; West Virginia, 2.

The figures given in the table for cream and skimmed milk represent the quantities of these materials delivered as such at the factories rather than the quantities actually used in the manufacture of butter, cheese, and other products. Large additional quantities of cream are separated from whole milk at the butter factories, and while much of the skimmed milk resulting from this separation is sold or returned to patrons, the quantities used in the manufacture of cheese and casein doubtless far exceed the small quantities reported as purchased. Moreover, in some instances considerable quantities of whole milk and cream are sold by the factories instead of being used for manufacturing purposes. It is evident, therefore, that the figures in the table do not represent the actual quantities of the specified materials used in the manufacture of the different products.

There were considerable differences among the states with respect to the relative quantities of milk and cream reported. In New York, for instance, the establishments in the industry reported 2,422,727,788 pounds of milk and only 17,842,320 pounds of cream in 1909, or 1 pound of cream to 135.8 pounds of milk, while the factories in Wisconsin reported 2,366,154,761 pounds of milk and 246,838,822 pounds of cream, or 1 pound of cream to 9.6 pounds of milk. The figures

for Vermont show 1 pound of cream to 5 pounds of milk, and for Connecticut, one of the states where the industry is practically confined to the manufacture of butter, the quantity of cream reported was more than three times as great as the quantity of milk. The relative quantity of milk used in a given state depends in a measure upon the extent to which cheese and condensed milk are manufactured in the state, and the states showing the smallest ratios between the quantity of milk and the quantity of cream reported as materials are those in which butter is the principal product of the industry. It is evident, however, that there are other important factors to be considered. Chief among these, perhaps, is the extent to which it has become customary, in the sections where the butter factories are located, for the farmers to separate the milk on the farm and send the cream to the factory instead of the whole milk, as was the practice before the hand separator came into general use.

In quantity of milk reported New York and Wisconsin were the foremost states in 1909, with 24.5 per cent and 23.9 per cent, respectively, of the total, while Wisconsin, Iowa, and Minnesota, ranking in the order named, together reported more than half of the cream purchased.

Sugar is used for the most part in the manufacture of sweetened condensed milk, and the extent to which it is used is therefore directly dependent upon the production of this variety of condensed milk.

Milk and cream used in leading states: 1909, 1904, and 1899.—Table 21 shows for 1909, 1904, and 1899 the quantities of milk and cream reported for the 12 states which led in 1909 with respect to value of products for the industry.

BUTTER, CHEESE, AND CONDENSED MILK—MILK AND CREAM USED IN LEADING STATES: 1909, 1904, AND 1899.

Table 21 STATE.	Cen-sus.	Milk (pounds).	Cream (pounds).
United States.....	1909	9,888,727,303	1,406,143,908
	1904	12,147,304,550	588,188,471
	1899	11,678,082,821	203,673,858
Wisconsin.....	1909	2,366,154,761	246,838,822
	1904	2,665,903,141	80,032,094
	1899	1,973,762,160	27,026,227
New York.....	1909	2,422,727,788	17,842,320
	1904	2,716,366,410	6,176,069
	1899	2,308,599,597	2,496,730
Iowa.....	1909	474,821,988	243,619,568
	1904	1,994,925,394	110,850,356
	1899	1,586,044,620	45,621,241
Minnesota.....	1909	645,597,385	236,861,608
	1904	1,072,506,743	57,582,246
	1899	852,728,424	14,816,175
Illinois.....	1909	707,013,502	44,565,553
	1904	809,720,061	11,062,470
	1899	1,038,843,401	4,171,210
Michigan.....	1909	478,008,911	83,241,827
	1904	670,230,324	7,714,987
	1899	313,871,971	2,816,106
Pennsylvania.....	1909	787,448,479	16,061,716
	1904	946,150,704	4,167,213
	1899	927,955,335	3,587,909
California.....	1909	206,222,323	101,128,644
	1904	481,091,233	29,504,300
	1899	316,287,052	1,151,300
Ohio.....	1909	344,686,001	41,291,271
	1904	405,702,734	6,582,108
	1899	375,013,872	5,700,296
Vermont.....	1909	240,020,144	48,343,294
	1904	342,225,993	49,742,424
	1899	432,279,103	22,868,877
Nebraska.....	1909	167,861,401	56,010,365
	1904	157,978,290	32,312,868
	1899	179,461,039	9,941,850
Washington.....	1909	150,544,931	29,415,008
	1904	66,762,847	23,595,768
	1899	72,061,394	3,071,243

¹ Exclusive of statistics for 1 establishment engaged in the manufacture of condensed milk.

The total quantity of milk reported for 1904 was slightly larger than that for 1899, but taking the decade as a whole the figures show a decrease of 15.3 per cent—from 11,678,082,821 pounds in 1899 to 9,888,727,303 pounds in 1909. On the other hand, the quantity of cream reported shows a steady increase from 203,673,958 pounds in 1899 to 1,406,143,908 pounds, or nearly seven times as much, in 1909.

In all the states for which separate figures are given in the table, large increases took place during each five-year period in the amount of cream reported by the factories, except in Vermont, where the quantity decreased somewhat between 1904 and 1909. On the other hand, there were only four states, Wisconsin, New York, Michigan, and Washington, in which the

quantity of milk reported for 1909 was greater than that for 1899, and only two, Nebraska and Washington, in which it was greater than that for 1904. The most pronounced decrease during the decade in the quantity of milk was in Iowa, in which state there was a decrease of 1,111,222,632 pounds, or about five-eighths of the net decrease during the decade in the industry as a whole.

The rapid increase in the quantity of cream reported (together with the decrease in the quantity of milk which generally accompanies it) is doubtless due in large measure to the introduction of the hand separator, which enables the farmer to separate the milk economically on the farm. The importance of the increase in the relative quantity of cream purchased, and of the hand separator as a factor in bringing about this change, is the more evident in view of the fact that the whole increase must be accounted for by the butter-making branch of the industry, since cream is not used to any extent in the manufacture of either cheese or condensed milk.

Quantity of leading products, by states: 1909, 1904, and 1899.—Table 22 gives, by states, the quantities of butter, cheese, and condensed milk made in the factories of the industry, as reported at the censuses of 1909, 1904, and 1899.

Attention is again called to the fact that in the tables showing separately the quantities of butter, cheese, and condensed milk manufactured the figures represent the total quantity of the given product reported for the industry as a whole, whether made in establishments engaged primarily in the manufacture of that product or in establishments belonging to one of the other branches of the industry. The products made in establishments in other industries are not included in the totals, but the quantities, so far as available, are shown in a footnote.

In the quantity of butter manufactured in the factories of the industry there was an increase of 204,638,107 pounds, or 48.7 per cent, during the decade 1899-1909. Wisconsin ranked first in the production of butter in 1909, with 103,884,684 pounds; Minnesota was second, with 88,842,846 pounds; and Iowa was third, with 88,582,187 pounds. The figure shown for Wisconsin represents an increase of 68.1 per cent over the production of 1899, that for Minnesota an increase of 115.8 per cent, and that for Iowa an increase of 14.7 per cent. In 11 of the states for which separate figures are given in Table 21 the quantity of butter manufactured in 1909 was less than in 1899, Illinois showing the largest absolute decrease and New Hampshire the largest relative decrease. Although the manufacture of butter was reported from 43 states in 1909, the combined product of 6 states, Wisconsin, Minnesota, Iowa, New York, California, and Michigan, amounting to 400,002,143 pounds, represented 64 per cent of the total for the industry.

MANUFACTURES.

BUTTER, CHEESE, AND CONDENSED MILK—PRINCIPAL PRODUCTS, BY STATES: 1909, 1904, AND 1899.

Table 22	STATE.	Census.	Butter (pounds).	Cheese (pounds).	Condensed milk (pounds).	STATE.	Census.	Butter (pounds).	Cheese (pounds).	Condensed milk (pounds).	
United States ¹	1909		624,764,653	311,126,317	494,796,544	Montana	1909	1,307,777			
	1904		531,478,141	317,144,872	308,485,182		1904	(²)			
	1899		420,126,546	281,972,324	186,921,737		1899	34,238			
Arizona	1909		1,053,869	421,043	(²)	Nebraska	1909	23,973,162	77,122		
	1904		799,433	161,796	162,000		1904	16,035,468	158,470		
	1899		424,083	373,752			1899	11,728,180	313,600		
Arkansas	1909		360,834		(²)	Nevada	1909	1,039,784			
	1904		127,309				1904	758,184	33,000		
	1899		168,575	12,600			1899	623,402	80,150		
California	1909		37,283,450	1,567,640	(²)	New Hampshire	1909	1,740,235	184,497		
	1904		26,837,356	3,601,051	7,723,021		1904	3,098,889	207,149	(²)	
	1899		13,147,137	2,676,543	4,314,666		1899	5,034,270	116,741	2,876,157	
Colorado	1909		6,351,691	550,622	(²)	New Jersey	1909	768,857		7,688,412	
	1904		5,054,006	871,673	(²)		1904	1,178,846	6,700	(²)	
	1899		1,566,639	1,465,257			1899	1,325,519	100,000	1,072,000	
Connecticut	1909		1,950,935		(²)	New York	1909	45,897,216	105,194,898	120,601,999	
	1904		2,903,277	(²)	1904		58,256,504	132,836,482	102,480,355		
	1899		3,888,405	321,263			1899	40,693,846	127,356,032	75,447,148	
Delaware	1909		627,300	(²)		North Dakota	1909	3,683,679	(²)		
	1904		644,823	(²)	1904		3,013,151	51,894			
	1899		969,889	15,000			1899	463,188	225,399		
Georgia	1909		78,058			Ohio	1909	17,491,251	11,860,601	37,655,347	
	1904		133,900		1904		11,591,981	17,351,773	1,947,218		
	1899		48,960		1899		8,087,631	18,156,527	100,000		
Idaho	1909		2,357,386	(²)		Oklahoma	1909	4,110,978			
	1904		671,783	132,420	1904		416,100				
	1899		432,570	194,380	1899		53,200	66,378			
Illinois	1909		24,570,976	4,799,235	114,500,748	Oregon	1909	8,472,660	4,218,953	21,788,937	
	1904		27,339,925	5,301,211	95,425,052		1904	5,080,599	2,255,592	(²)	
	1899		34,055,312	9,055,119	71,257,449		1899	1,975,357	1,195,564		
Indiana	1909		11,712,450	424,597	6,674,660	Pennsylvania	1909	30,484,217	11,234,037	26,461,384	
	1904		4,742,632	978,903	³ 317,721		1904	35,754,841	11,453,424	20,364,700	
	1899		3,553,483	1,260,168	204,000		1899	37,137,161	10,267,443	2,862,000	
Iowa	1909		88,582,187	999,559	4,984,333	South Dakota	1909	9,495,608			
	1904		71,181,766	2,829,745	(²)		1904	11,058,460	(²)		
	1899		77,233,264	4,242,637			1899	6,172,107	420,779		
Kansas	1909		18,712,568		(²)	Texas	1909	2,133,590	(²)	(²)	
	1904		16,488,131	1,120,863			1904	266,806			
	1899		18,196,483	2,422,710	144,640		1899	252,714	58,290		
Kentucky	1909		549,929			Utah	1909	3,722,784	1,060,122	(²)	
	1904		239,051				1904	3,586,547	1,629,730	² 127,800	
	1899		184,663	28,000			1899	2,519,214	1,874,179		
Maine	1909		2,105,622	55,591	(²)	Vermont	1909	20,227,495	2,762,656	13,342,666	
	1904		5,005,907	361,850	(²)		1904	27,256,874	4,343,160	(²)	
	1899		4,461,399	553,946	2,373,786		1899	22,453,381	4,713,105	1,973,556	
Maryland	1909		1,118,530		(²)	Virginia	1909	158,853	(²)		
	1904		1,816,433				1904	81,803	(²)		
	1899		2,541,716				1899	170,521	57,000		
Massachusetts	1909		1,888,307			Washington	1909	11,302,591	422,290	53,614,242	
	1904		3,470,323	(²)	1904		7,722,911	921,383	13,841,906		
	1899		4,591,919	250,542	108,000		1899	3,198,421	1,482,127	1,962,500	
Michigan	1909		35,511,760	13,382,160	32,404,944	Wisconsin	1909	103,884,684	148,065,648	30,573,886	
	1904		21,013,000	16,814,856	27,681,608		1904	89,155,975	109,423,856	11,514,222	
	1899		7,820,712	10,422,582	18,378,869		1899	61,813,502	77,748,680	3,466,516	
Minnesota	1909		88,842,846	2,735,883		Wyoming	1909	783,585	(²)		
	1904		62,122,554	3,090,055	79,120		1904	500,515	84,600		
	1899		41,174,469	3,285,019			⁴ 1899				
Missouri	1909		10,261,876	219,112	(²)	All other states ⁶	1909	165,073	890,051	24,504,986	
	1904		5,806,724	743,447			1904	265,314	379,789	28,320,459	
	1899		1,440,616	1,072,751	380,500		1899	492,400	58,061		

¹ In addition, in 1909, 2,381,212 pounds of butter, 49,413 pounds of part-cream cheese, and 401,300 pounds of condensed milk, and in 1904, 1,971,120 pounds of butter, were reported by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

² Included with the quantity shown for "all other states," to avoid the disclosure of individual operations.

³ The product of 2 establishments in Indiana and 1 in Utah engaged in the manufacture of condensed milk in 1904 was included with that for "all other states," to avoid the disclosure of individual operations.

⁴ The product of the 2 establishments reported from Wyoming in 1899 was included with that for "all other states" to avoid the disclosure of individual operations.

⁵ "All other states" embrace: For 1909—Alabama, Louisiana, New Mexico, Rhode Island, and West Virginia, and certain products manufactured in Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Idaho, Kansas, Maine, Maryland, Missouri, North Dakota, Texas, Utah, and Wyoming; for 1904—Rhode Island, Tennessee, and West Virginia, and establishments in Colorado, Connecticut, Delaware, Indiana, Iowa, Maine, Massachusetts, Montana, New Hampshire, New Jersey, New York, Oregon, South Dakota, Utah, Vermont, and Virginia (see Notes 2 and 3); and for 1899—Alabama, Mississippi, Rhode Island, Tennessee, West Virginia, and Wyoming.

The production of cheese in 1909 was 1.9 per cent less than that in 1904, and only 10.3 per cent greater than that in 1899, and since both of the other main products of this industry show a considerable increase for the period 1904-1909, as well as for the decade, it may be inferred that milk is less profitably used in the manufacture of cheese than in the manufacture of

butter or condensed milk. Of the 34 states for which separate figures for the production of cheese in 1899 are shown, 8 did not report any cheese for 1909, and 14 reported a smaller quantity than for 1899. By far the largest gain in any state during the decade 1899-1909 was that in Wisconsin, amounting to 70,316,968 pounds, or 90.4 per cent. The greatest

absolute decrease for the decade considered as a whole was in New York, where the quantity reported in 1909 was 22,191,134 pounds, or 17.4 per cent, less than that in 1899; there was an increase in the production of cheese in this state, however, between 1899 and 1904.

Condensed milk shows an increase in production for the decade 1899-1909 amounting to 307,874,757 pounds, or 164.7 per cent. The bulk of this product was reported by a small number of states. New York produced 24.4 per cent of the total quantity in 1909, Illinois 23.1 per cent, and Washington 10.8 per cent, the combined output of these three states representing 58.4 per cent of the total for the industry. The quantity of condensed milk produced in the five states next in rank, namely, Ohio, Michigan, Wisconsin, Pennsylvania, and Oregon, represented 30 per cent of the total, making 88.4 per cent for the eight states taken together. Four states, Arkansas, Connecticut, Maryland, and Texas, reported the production of condensed milk for the first time in 1909, but the quantity can not be shown separately without disclosing individual operations. There were three states which had reported this product at one or more of the earlier censuses that reported none for 1909.

Quantity of leading products, by geographic divisions: 1909, 1904, and 1899.—Table 23 shows the quantities of the principal products of the butter, cheese, and condensed milk industry, by geographic divisions, for 1909, 1904, and 1899.

In the production of butter the three most important divisions at each census were the West North Central, the East North Central, and the Middle Atlantic, ranking in the order named. In 1909 the West North Central division produced 39 per cent of the total quantity of butter reported for the industry, the East North Central division 30.9 per cent, and the Middle Atlantic 12.3 per cent, these three leading divisions together reporting over four-fifths of the total. The quantity of butter made in factories in the West North Central and East North Central divisions shows an increase for each five-year period, and the proportions which their output formed of the total for the industry were greater in 1909 than in either 1904 or 1899. The production in the Middle Atlantic division increased between 1899 and 1904, but decreased between 1904 and 1909 to a figure below that of 1899, and formed a smaller percentage of the total at each successive census. Of the remaining divisions only two, the New England and the South Atlantic, reported a smaller output in 1909 than in 1899. In the Pacific, Mountain, and West South Central divisions the increases during each five-year period were considerable and the proportions which these divisions contributed to the total production were larger in 1909 than in 1904 or 1899.

Of the total factory production of cheese at each census more than nine-tenths was reported from two divisions—the East North Central and Middle Atlantic. In 1899 the Middle Atlantic division ranked first in quantity of cheese reported, but in 1904 and

1909 it was outranked by the East North Central division. The production in the latter division and the percentage which this formed of the total for the industry show an uninterrupted increase throughout the decade.

BUTTER, CHEESE, AND CONDENSED MILK—PRINCIPAL PRODUCTS, BY GEOGRAPHIC DIVISIONS: 1909, 1904, AND 1899.

DIVISION AND CENSUS.	BUTTER.		CHEESE.		CONDENSED MILK.	
	Quantity (pounds).	Per cent of total.	Quantity (pounds).	Per cent of total.	Quantity (pounds).	Per cent of total.
United States¹						
1909.....	824,764,653	100.0	311,126,317	100.0	494,788,544	100.0
1904.....	531,478,141	100.0	317,144,872	100.0	308,485,182	100.0
1899.....	420,126,546	100.0	281,972,324	100.0	188,921,787	100.0
New England division:						
1909.....	27,912,594	4.5	3,002,744	1.0	² 13,342,666	2.7
1904.....	41,735,270	7.9	² 4,912,159	1.5	(?)	—
1899.....	40,429,374	9.6	5,955,597	2.1	7,331,499	3.9
Middle Atlantic division:						
1909.....	77,150,290	12.3	116,428,985	37.4	154,751,795	31.3
1904.....	95,190,191	17.9	144,296,606	45.5	² 122,845,055	39.8
1899.....	79,156,526	18.8	137,753,475	48.9	79,381,148	42.5
East North Central division:						
1909.....	193,171,121	30.9	178,532,241	57.4	221,809,585	44.8
1904.....	153,845,513	28.9	149,370,599	47.3	² 134,885,821	43.7
1899.....	115,330,640	27.5	116,643,076	41.4	93,406,834	50.0
West North Central division:						
1909.....	243,551,926	39.0	² 4,031,676	1.3	² 4,984,333	1.0
1904.....	185,706,254	34.9	7,994,474	2.5	79,120	(1)
1899.....	156,406,307	37.2	11,982,895	4.2	525,140	0.3
South Atlantic division:						
1909.....	1,982,741	0.3	(?)	—	(?)	—
1904.....	2,676,959	0.5	(?)	—	—	—
1899.....	3,731,086	0.9	72,000	(?)	—	—
East South Central division:						
1909.....	549,929	0.1	—	—	—	—
1904.....	239,061	0.3	—	—	—	—
1899.....	184,663	0.3	28,000	(?)	—	—
West South Central division:						
1909.....	6,605,402	1.1	(?)	—	(?)	—
1904.....	810,215	0.2	—	—	—	—
1899.....	474,489	0.1	137,268	(?)	—	—
Mountain division:						
1909.....	16,616,876	2.7	² 2,031,787	0.7	(?)	—
1904.....	11,370,468	2.1	2,913,219	0.9	² 289,800	0.1
1899.....	5,600,146	1.3	3,987,718	1.4	—	—
Pacific division:						
1909.....	57,058,701	9.1	6,208,883	2.0	² 75,403,179	15.2
1904.....	39,640,898	7.5	6,778,026	2.1	² 21,564,927	7.0
1899.....	18,320,915	4.4	5,354,234	1.9	6,277,166	3.4
Production in states which can not be distributed by geographic divisions without disclosing individual operations:						
1909.....	165,073	(?)	890,051	0.3	24,504,986	5.0
1904.....	265,314	(?)	379,789	0.1	28,820,459	9.3
1899.....	492,400	0.1	58,061	(?)	—	—

¹ In addition, in 1909, 2,381,212 pounds of butter, 49,413 pounds of part-cream cheese, and 401,300 pounds of condensed milk, and in 1904, 1,971,120 pounds of butter, were reported by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

² Quantities not shown by states in Table 22 are included under "production in states which can not be distributed by geographic divisions without disclosing individual operations."

³ Less than one-tenth of 1 per cent.

The manufacture of condensed milk, like that of cheese, is largely centralized, although it was so to a less extent in 1909 than in 1904 or 1899. In 1909, as in the two earlier census years, the East North Central and Middle Atlantic divisions together produced by far the greater part of the total output of condensed milk, but notwithstanding large increases in actual production in both divisions the percentage which the product of the Middle Atlantic division represented of the total was lower in 1909 than at the earlier censuses. This is due chiefly to the remarkable increase during the decade in the Pacific division, which produced 15.2 per cent of the total quantity of condensed milk in 1909, as compared with 3.4 per cent in 1899.

Quantity and value of products, by states: 1909.—Table 24 shows in detail the products of the industry in the several states for 1909.

MANUFACTURES.

BUTTER, CHEESE, AND CONDENSED MILK—DETAILED

Table 24	STATE.	BUTTER.						CHEESE.					
		Total.		Packed solid.		In prints or rolls.		Total.		Full-cream.		Part-cream.	
		Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1	United States ¹ ..	824,764,653	\$179,510,619	410,692,616	\$115,098,056	214,072,037	\$64,412,563	311,126,317	\$43,239,924	287,110,383	\$40,817,073	10,803,392	\$1,183,000
2	Arizona.....	1,053,869	318,190	48,694	14,177	1,005,175	304,013	421,043	67,210	(²)	(²)	(²)	(²)
3	Arkansas.....	360,834	107,565	130,458	37,187	230,376	70,378						
4	California.....	37,283,450	11,644,453	7,764,696	2,388,265	29,518,754	9,256,188	1,567,640	252,582	1,444,640	239,286	123,000	13,298
5	Colorado.....	6,351,691	1,863,695	664,599	183,200	5,687,092	1,680,495	550,622	77,550	406,620	59,144	144,002	18,408
6	Connecticut.....	1,950,935	632,550	164,536	49,783	1,786,399	582,767						
7	Delaware.....	627,300	184,438	39,129	10,711	588,171	173,727	(²)	(²)	(²)	(²)	(²)	(²)
8	Georgia.....	78,058	23,171	47,750	14,325	30,308	8,846						
9	Idaho.....	2,357,386	760,820	434,063	123,352	1,923,323	627,468	(²)	(²)	(²)	(²)		
10	Illinois.....	24,570,976	7,088,414	14,767,503	4,215,191	9,803,473	2,873,223	4,799,235	520,486	2,919,897	398,397	561,028	58,005
11	Indiana.....	11,712,450	3,301,014	8,170,531	2,279,029	3,541,919	1,021,985	424,597	61,503	424,597	61,503		
12	Iowa.....	88,582,187	24,440,715	75,581,191	20,800,762	13,000,996	3,639,953	999,559	148,876	999,559	148,876		
13	Kansas.....	18,712,568	4,997,903	10,659,510	2,739,351	8,053,058	2,198,522	(²)	(²)	(²)	(²)	(²)	(²)
14	Kentucky.....	549,929	170,867	236,732	63,985	313,197	106,882						
15	Maine.....	2,105,622	713,620	340,806	99,745	1,764,816	613,875	55,591	8,876	54,591	8,776	1,000	100
16	Maryland.....	1,118,530	323,052	234,090	65,253	884,440	257,829						
17	Massachusetts.....	1,888,307	599,518	493,939	141,369	1,394,368	458,149						
18	Michigan.....	35,511,760	10,043,137	30,328,760	8,586,270	5,183,000	1,456,867	13,382,160	1,911,875	13,028,317	1,860,879	76,220	10,984
19	Minnesota.....	88,842,846	24,581,058	81,104,848	22,359,427	7,737,998	2,221,631	2,735,883	374,716	2,695,883	371,516	40,000	3,200
20	Missouri.....	10,261,876	2,862,230	4,452,602	1,213,508	5,809,274	1,648,722	219,112	30,122	219,112	30,122		
21	Montana.....	1,307,777	405,346	211,531	61,339	1,096,246	344,007						
22	Nebraska.....	23,973,162	6,570,084	13,652,328	3,654,578	10,320,834	2,915,506	77,122	10,407	77,122	10,407		
23	Nevada.....	1,039,784	318,727	86,366	25,050	953,418	293,677						
24	New Hampshire.....	1,740,235	542,462	1,123,533	344,981	616,702	197,481	184,497	28,642	176,697	27,472	7,800	1,170
25	New Jersey.....	768,857	240,890	160,490	51,902	608,367	188,988						
26	New York.....	45,897,216	13,471,482	31,481,828	9,127,057	14,415,388	4,344,425	105,194,898	14,266,924	89,055,411	12,502,997	7,171,365	778,770
27	North Dakota.....	3,683,679	981,355	2,873,519	756,158	810,160	225,197	(²)	(²)	(²)	(²)		
28	Ohio.....	17,491,251	4,985,273	11,265,341	3,162,518	6,225,910	1,822,755	11,860,601	1,533,517	9,768,970	1,305,461	1,550,560	197,656
29	Oklahoma.....	4,110,978	1,125,691	2,410,982	640,290	1,700,046	485,401						
30	Oregon.....	8,472,660	2,682,106	992,102	298,721	7,480,558	2,383,385	4,218,953	640,868	4,166,038	631,259	37,415	5,369
31	Pennsylvania.....	30,484,217	9,613,299	9,283,220	2,741,957	21,200,997	6,871,342	11,234,037	1,414,890	9,423,849	1,314,704	490,685	42,921
32	South Dakota.....	9,495,608	2,598,413	8,880,010	2,424,897	615,598	173,516						
33	Texas.....	2,133,590	612,315	581,193	163,020	1,552,397	449,295	(²)	(²)	(²)	(²)		
34	Utah.....	3,722,784	1,137,388	650,707	193,311	3,072,077	944,077	1,060,122	157,058	(²)	(²)	(²)	(²)
35	Vermont.....	20,227,495	6,022,066	12,569,015	3,673,807	7,638,480	2,348,259	2,762,656	395,778	2,576,073	378,057	186,583	17,721
36	Virginia.....	158,853	42,966	121,576	33,147	37,277	9,819	(²)	(²)	(²)	(²)		
37	Washington.....	11,302,591	3,692,931	1,418,308	434,227	9,884,283	3,258,704	422,290	65,597	(²)	(²)	(²)	(²)
38	Wisconsin.....	103,884,684	29,547,135	77,137,253	21,833,972	26,747,431	7,713,163	148,065,648	21,141,640	147,071,501	21,070,010	229,892	19,405
39	Wyoming.....	783,585	223,525	15,344	4,129	768,241	219,396	250,719	40,115	250,719	40,115		
40	All other states.....	165,073	50,725	93,583	28,075	71,490	22,650	639,332	90,692	2,350,787	358,092	183,842	20,997

¹ In addition, 2,381,212 pounds of butter, valued at \$664,171, 49,413 pounds of part-cream cheese, valued at \$5,745, 401,300 pounds of condensed milk, valued at \$24,078, and other dairy products, to the value of \$25,388 were produced by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

THE BUTTER, CHEESE, AND CONDENSED MILK INDUSTRY.

STATISTICS OF PRODUCTS, BY STATES: 1909.

	CHEESE—continued.				CONDENSED MILK.						CREAM SOLD.		CASEIN.		SKIM-MED MILK SOLD.	WHEY.
	Skimmed.		Other kinds.		Total.		Sweetened.		Unsweetened.		Pounds.	Value.	Pounds.	Value.	Value.	Value.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.						
1	7,770,812	\$429,519	5,441,730	\$805,332	494,796,644	\$33,563,129	214,518,310	\$17,345,278	280,278,234	\$16,217,351	81,211,374	\$9,828,972	13,018,298	\$795,544	\$829,135	\$53,377
2					(2)	(2)			(2)	(2)	181,209	26,596			262	
3					(2)	(2)			(2)	(2)	72,650	7,339			1,677	
4					(2)	(2)			(2)	(2)	2,674,825	411,473	1,412,919	75,435	13,653	675
5					(2)	(2)	(2)	(2)	(2)	(2)	1,207,001	142,697	2,500	250	5,493	
6					(2)	(2)			(2)	(2)	854,591	84,221	41,647	2,500	287	
7			(2)	(2)							495,434	50,662			8,190	
8											417,800	49,934				
9											417,800	49,934				
10	1,165,289	53,373	153,021	10,711	114,500,748	8,437,627	48,240,252	4,468,085	66,260,496	3,969,542	11,436,133	1,274,796	794,098	47,353	102,226	6,173
11					6,674,660	350,812	1,045,590	72,631	5,629,070	277,181	968,026	94,916	16,000	1,515	1,493	
12					4,984,333	384,263	1,278,445	104,591	3,705,888	279,672	1,169,943	124,156		303	8,181	54
13					(2)	(2)	(2)	(2)	(2)	(2)	520,802	83,233	85,491	3,527	7,191	
14					(2)	(2)	(2)	(2)	(2)	(2)	292,209	35,692			8,782	
15					(2)	(2)	(2)	(2)	(2)	(2)	1,842,731	243,126	188,905	15,104	21,515	
16					3,962,285	208,787	3,436,289	187,757	525,996	21,030	1,225,490	109,624	44,227	2,657	7,616	
17											241,677	31,251	134,860	9,855	2,520	
18	150,000	7,950	127,623	32,062	32,404,944	1,924,621	27,695,866	1,693,030	4,709,078	231,591	2,572,764	249,276	116,592	5,937	32,898	5,261
19					(2)	(2)			(2)	(2)	1,338,833	146,867			1,354	810
20											122,357	18,836			1,246	200
21											42,541	5,181				
22											281,811	27,149	107,211	620	500	
23											22,096	2,837			850	
24											1,038,205	167,673	145,503	17,196	21,629	
25					7,638,412	396,183	2,324,572	139,261	5,363,840	256,822	786,875	95,037	27,153	1,221	4,859	
26	4,455,681	291,246	4,512,441	693,911	120,601,999	9,428,283	87,658,031	7,575,218	32,943,968	1,853,065	27,078,783	3,481,296	6,712,971	482,308	121,601	21,124
27											3,348	496	684,000	1,300	486	
28	346,310	14,017	194,761	16,383	37,655,347	2,409,959	4,232,160	258,529	33,423,187	2,153,430	4,735,900	500,528	94,452	6,963	76,645	5,774
29											17,740	1,762			90	
30			15,500	4,240	21,788,937	1,164,360	(2)	(2)	(2)	(2)	1,019,239	132,097			300	176
31	1,206,400	40,300	113,103	16,965	26,461,384	1,481,413	10,777,613	733,399	15,633,771	743,014	4,754,954	531,432	2,197,418	106,480	122,125	610
32											390,108	43,147			1,583	
33					(2)	(2)			(2)	(2)	149,281	19,152			4,128	
34					10,735,958	545,051	132,000	9,900	10,603,958	535,151	1,114,836	128,528	9,342	542		467
35					13,342,666	975,663	9,096,582	669,325	4,246,084	306,338	4,502,709	600,293	4,389	1,442	9,898	5,325
36											7,469	978			150	
37					53,614,242	2,976,326			53,614,242	2,976,326	3,009,180	341,981			100	270
38	447,132	22,633	317,123	29,592	30,573,886	2,218,239	16,661,772	1,240,398	13,912,114	977,841	4,490,508	545,723	215,760	12,671	41,234	6,958
39											42,116	4,455				
40			8,158	1,468	9,806,743	661,542	1,939,138	189,054	29,656,542	1,636,848	29,200	4,380	4,860	365	375	

* Figures included with those for "all other states," to avoid the disclosure of individual operations.

Quantity and value of products for the United States: 1909, 1904, and 1899.—Table 25 shows in detail the products of the industry for 1909, 1904, and 1899.

BUTTER, CHEESE, AND CONDENSED MILK—QUANTITY AND VALUE OF PRODUCTS: 1909, 1904, AND 1899.

PRODUCT.	1909	1904	1899
Total value	1 \$274, 557, 718	2 \$168, 182, 789	\$130, 783, 349
Butter:			
Pounds.....	624, 764, 653	531, 478, 141	420, 126, 546
Value.....	\$179, 510, 619	\$113, 189, 453	\$84, 079, 754
Packed solid—			
Pounds.....	410, 692, 616	364, 432, 996	328, 956, 590
Value.....	\$115, 098, 056	\$74, 483, 306	\$63, 961, 893
Prints and rolls—			
Pounds.....	214, 072, 037	167, 045, 145	91, 169, 956
Value.....	\$64, 412, 563	\$33, 706, 147	\$20, 117, 861
Cheese:			
Pounds.....	311, 126, 317	317, 144, 872	281, 972, 324
Value.....	\$43, 239, 924	\$28, 611, 760	\$26, 519, 829
Full-cream—			
Pounds.....	287, 110, 383		
Value.....	\$40, 817, 073		
Part-cream—		239, 652, 634	225, 776, 105
Pounds.....	10, 803, 392	\$22, 024, 853	\$21, 363, 477
Value.....	\$1, 188, 000		
Skimmed—			
Pounds.....	7, 770, 812	3, 459, 582	(3)
Value.....	\$429, 519	\$148, 568	(3)
Other kinds—			
Pounds.....	5, 441, 730	74, 032, 656	56, 196, 219
Value.....	\$305, 332	\$6, 438, 339	\$5, 156, 352
Condensed milk:			
Pounds.....	494, 796, 544	308, 485, 182	186, 921, 787
Value.....	\$33, 563, 129	\$20, 149, 282	\$11, 888, 792
Sweetened—			
Pounds.....	214, 518, 310	198, 355, 189	(3)
Value.....	\$17, 345, 278	\$13, 478, 376	(3)
Unsweetened—			
Pounds.....	280, 278, 234	110, 129, 993	(3)
Value.....	\$16, 217, 851	\$6, 670, 906	(3)
Cream sold:			
Pounds.....	81, 211, 374	28, 131, 914	61, 764, 552
Value.....	\$9, 828, 972	\$2, 364, 407	\$4, 435, 444
Skimmed milk sold:			
Pounds.....	352, 594, 574	1, 161, 414, 457	2, 253, 494, 156
Value.....	\$629, 135	\$1, 368, 738	\$2, 531, 460
Casein:			
Pounds.....	13, 018, 298	11, 581, 874	12, 298, 405
Value.....	\$795, 544	\$554, 099	\$383, 581
All other products.....	\$6, 990, 395	\$1, 945, 050	\$944, 489

¹ In addition, 2,381,212 pounds of butter, valued at \$664,171, 49,413 pounds of part-cream cheese, valued at \$5,745, 401,300 pounds of condensed milk, valued at \$24,078, and other dairy products to the value of \$25,388 were produced by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

² In addition, 1,971,120 pounds of butter, valued at \$448,729, and other dairy products to the value of \$71,588 were produced by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

³ Not reported separately.

In 1909, 34.3 per cent of the total production of butter reported for the industry was put up in prints and rolls, as compared with 31.4 per cent in 1904 and 21.7 per cent in 1899, the remainder in each case being packed solid. The increase from 1899 to 1909 in the quantity of butter put up in prints and rolls amounted to 122,902,081 pounds, or 134.8 per cent, and the in-

crease in butter packed solid to 81,736,026 pounds, or 24.8 per cent.

Of the total quantity of cheese made in the factories of the industry in 1909, 92.3 per cent was full-cream cheese, 3.5 per cent was part-cream cheese, 2.5 per cent was skimmed-milk cheese, and 1.7 per cent was reported under the heading of "other kinds," comprising a number of fancy varieties, such as Neufchâtel and Brie.

The several kinds of cheese were not uniformly reported at the three censuses. The supplemental schedule used for the industry in 1904 called for separate returns for three classes of cheese, designated, respectively, standard factory (cheddars or flats), skimmed cheese, and "other kinds," while that used in 1899 distinguished only two kinds, standard factory and "other kinds." Further, the quantities of full-cream and part-cream cheese reported for 1909 include a number of kinds of cheese that in 1904 and 1899 were classified as "other kinds."

The two kinds of condensed milk, sweetened and unsweetened, were not reported separately prior to 1904. During the five-year period 1904-1909, however, the increase in the production of unsweetened condensed milk was much more rapid than that in the production of the sweetened variety—the respective percentages being 154.5 and 8.1. The proportion which unsweetened condensed milk represented of the total production thus increased from 35.7 per cent in 1904 to 56.6 per cent in 1909.

The quantity of skimmed milk sold shows a rapid decrease from census to census. This decrease is due in part to the growing practice of delivering cream instead of milk to butter factories, and in part to the growth of the condensed milk industry, in which the whole milk is used with no residue of skimmed milk.

The number of cream separators used by the factories decreased from 9,701 in 1899 to 8,842 in 1904 and 5,624 in 1909. This decrease is no doubt due in great part to the increasing use of separators on the farms, which has already been spoken of in connection with the large increase in the amount of cream received at the factories and the relative decrease in the amount of whole milk received.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the butter, cheese, and condensed milk industry are presented, by states, in Tables 26 and 27.

Table 26 shows for 1909, 1904, and 1899 the number

of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture, and Table 27 gives statistics in greater detail for 1909 only.

BUTTER, CHEESE, AND CONDENSED MILK—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaries employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	8,479	31,606	8,019	5,056	18,431	101,349	\$71,284	\$3,691	\$11,081	\$235,546	\$274,558	\$39,012
	1904	8,928	25,866	6,801	3,507	15,657	93,845	47,258	1,376	8,413	142,820	188,183	25,283
	1899	9,242	22,604	0,987	2,813	12,789	88,062	38,303	812	8,146	108,841	130,783	21,942
Arizona.....	1909	11	75	1	16	58	350	240	22	51	388	538	150
	1904	5	39	2	7	30	263	180	7	22	190	267	77
	1899	7	33	4	14	15	101	73	6	9	122	148	28
Arkansas.....	1909	9	28	4	11	13	163	97	4	7	105	131	26
	1904	3	8	3	1	4	42	11	1	2	28	33	5
	1899	8	13	5	3	5	72	27	1	-2	25	33	8
California.....	1909	161	916	119	202	597	2,496	2,829	202	466	11,140	12,761	1,621
	1904	281	997	269	125	603	3,026	2,107	78	414	6,460	7,821	1,381
	1899	178	629	137	90	402	1,922	1,157	47	203	2,981	3,583	602
Colorado.....	1909	39	304	26	68	210	657	1,221	68	130	1,924	2,340	416
	1904	120	141	16	28	97	476	593	31	69	1,081	1,290	209
	1899	38	133	35	18	80	403	204	11	40	471	618	147
Connecticut.....	1909	30	148	9	34	105	231	211	17	52	623	745	122
	1904	141	140	17	28	95	299	159	15	57	670	815	145
	1899	71	262	49	47	166	531	275	24	85	882	1,094	212
Delaware.....	1909	10	74	30	12	32	204	208	5	14	211	264	53
	1904	111	43	14	4	25	165	63	2	12	160	197	37
	1899	22	68	29	5	34	254	85	2	13	184	253	69
Georgia.....	1909	4	6	1	4	4	45	28	(*)	1	18	23	5
	1904	6	18	4	1	14	64	26		4	27	39	12
	1899	4	8	3	1	4	30	13	1	2	11	14	3
Idaho.....	1909	18	159	12	29	118	260	231	23	77	681	884	203
	1904	16	35	9	13	13	120	44	2	10	136	172	36
	1899	19	33	11	8	14	140	75	3	7	85	116	31
Illinois.....	1909	295	3,000	896	372	1,732	6,753	7,820	398	942	14,267	17,798	3,531
	1904	405	2,302	272	295	1,735	6,350	5,322	154	829	10,709	13,277	2,568
	1899	527	2,097	394	220	1,483	8,886	4,466	136	697	10,199	12,879	2,680
Indiana.....	1909	132	807	116	203	488	1,858	1,042	85	262	3,196	3,959	763
	1904	87	324	72	65	187	1,025	362	19	98	1,011	1,291	280
	1899	112	233	92	23	118	1,000	287	7	57	711	930	219
Iowa.....	1909	512	2,199	212	756	1,231	8,911	4,472	377	855	22,842	25,850	3,008
	1904	655	2,323	361	802	1,150	9,944	2,919	137	687	12,896	15,028	2,132
	1899	907	2,111	565	413	1,133	11,853	3,459	81	589	15,502	15,846	2,344
Kansas.....	1909	60	568	55	165	348	2,544	1,770	151	211	4,951	6,071	1,120
	1904	90	604	88	102	414	2,551	1,993	75	188	3,256	3,946	690
	1899	171	598	106	97	395	3,302	1,140	41	167	3,062	3,653	591
Kentucky.....	1909	13	78	5	17	56	164	81	10	30	195	275	80
	1904	3	21	6	3	12	37	19	3	5	48	84	36
	1899	9	31	14		17	37	19		5	55	77	22
Maine.....	1909	29	138	11	31	96	523	424	24	48	1,098	1,301	203
	1904	146	123	21	24	78	455	385	9	47	1,045	1,230	185
	1899	61	240	39	39	162	496	430	17	70	1,407	1,728	321
Maryland.....	1909	44	137	54	14	69	522	257	10	39	524	654	130
	1904	55	156	71	5	80	576	176	2	29	399	519	120
	1899	84	222	91	18	113	800	234	7	34	558	894	138
Massachusetts.....	1909	24	95	18	21	56	318	115	7	29	548	664	116
	1904	36	123	12	47	64	354	211	9	41	779	877	98
	1899	50	141	18	24	99	449	324	13	62	1,025	1,198	173
Michigan.....	1909	435	1,740	350	317	1,073	4,776	3,434	187	554	12,377	14,287	1,910
	1904	371	1,301	259	167	875	3,794	1,888	65	432	7,027	8,209	1,182
	1899	286	798	203	92	503	2,371	1,251	25	222	3,274	3,919	645
Minnesota.....	1909	784	1,971	425	362	1,184	11,874	4,752	137	829	22,707	25,287	2,580
	1904	771	1,563	286	236	1,041	11,511	3,305	63	634	11,140	12,871	1,731
	1899	596	1,291	210	341	740	8,025	2,265	59	398	7,189	8,480	1,291
Missouri.....	1909	56	277	31	87	159	788	701	68	100	2,499	2,959	480
	1904	54	241	42	51	148	573	546	33	69	1,033	1,314	281
	1899	79	164	66	24	74	639	200	5	31	329	432	103

1 Excluding statistics for 1 establishment, to avoid disclosure of individual operations.

* Less than \$500.

• Excluding statistics for 2 establishments, to avoid disclosure of individual operations.

MANUFACTURES.

BUTTER, CHEESE, AND CONDENSED MILK—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

Table 26—Continued.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.					Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).								
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).	Expressed in thousands.															
							1909								1904	1899	1909	1904	1899	1909	1904	1899
Montana.....	1909	20	43	4	10	29	235	\$179	\$9	\$24	\$354	\$419	\$65									
	1904																					
	1899	3	3	1	2	16	16	7		1	6	8	2									
Nebraska.....	1909	37	602	14	205	383	1,032	2,975	196	256	6,435	7,681	1,246									
	1904	40	390	24	113	253	861	1,861	102	137	2,672	3,326	654									
	1899	93	446	47	66	333	2,263	952	41	147	1,854	2,254	400									
Nevada.....	1909	9	25	3	6	16	94	102	5	15	289	326	37									
	1904	4	11	.....	1	10	57	57	(?)	9	161	197	30								
	1899	4	20	.....	9	11	45	50	3	6	127	148	21								
New Hampshire.....	1909	29	85	13	22	50	492	214	8	31	709	807	98									
	1904	34	103	20	20	63	514	163	6	36	730	864	134									
	1899	53	180	27	34	119	711	311	11	58	1,226	1,468	242									
New Jersey.....	1909	20	102	15	14	73	771	256	8	42	670	793	123									
	1904	29	74	26	5	43	353	135	1	21	318	395	77									
	1899	53	143	55	14	74	607	242	4	37	488	610	122									
New York.....	1909	1,552	4,930	1,483	581	2,866	16,629	12,216	507	1,607	36,161	42,458	6,297									
	1904	1,766	4,804	1,721	215	2,808	14,322	9,066	192	1,485	26,793	31,048	4,255									
	1899	1,908	4,438	1,772	227	2,439	13,905	7,084	122	1,157	22,487	26,558	4,071									
North Dakota.....	1909	68	106	32	12	62	854	312	8	46	891	1,029	138									
	1904	60	98	18	25	55	618	202	2	38	478	562	84									
	1899	21	31	13	5	13	191	52	1	8	96	122	26									
Ohio.....	1909	325	2,494	1,216	211	1,067	3,386	2,739	173	557	7,685	9,690	2,005									
	1904	431	867	318	61	488	3,462	1,428	19	292	3,729	4,593	864									
	1899	479	869	391	89	389	2,569	1,041	19	190	3,055	3,809	754									
Oklahoma.....	1909	19	101	17	22	62	427	197	19	36	928	1,150	222									
	1904	3	16	4	1	11	91	15	(?)	6	66	89	23									
	1899	5	8	5	.....	3	32	13	.....	2	14	19	5							
Oregon.....	1909	95	615	63	132	420	1,935	1,718	131	290	3,952	4,920	968									
	1904	98	257	91	36	130	715	429	17	81	1,361	1,629	268									
	1899	68	142	60	20	62	491	223	9	27	509	639	130									
Pennsylvania.....	1909	536	2,093	635	281	1,177	7,613	4,291	155	556	11,674	13,544	1,870									
	1904	645	2,152	623	311	1,218	9,463	3,649	89	556	9,656	11,681	1,925									
	1899	749	1,795	692	127	976	8,858	3,033	46	446	8,712	10,290	1,578									
South Dakota.....	1909	95	252	50	63	139	1,456	633	44	112	2,308	2,686	378									
	1904	97	350	32	126	192	1,410	484	26	125	1,833	2,183	350									
	1899	138	287	44	95	148	1,579	461	12	77	1,005	1,199	194									
Texas.....	1909	36	143	30	29	84	477	309	15	40	530	660	130									
	1904	10	19	12	2	5	62	35	1	4	49	63	14									
	1899	12	30	9	3	18	84	42	2	9	61	81	30									
Utah.....	1909	37	285	25	46	214	635	1,134	42	116	1,613	1,971	358									
	1904	49	159	38	23	98	813	407	16	85	789	964	175									
	1899	57	252	39	54	159	616	209	16	63	550	714	164									
Vermont.....	1909	186	699	104	76	519	2,944	1,795	48	292	7,056	8,112	1,056									
	1904	220	653	106	133	419	2,564	1,053	30	223	5,816	6,416	600									
	1899	255	801	142	137	522	3,624	1,223	38	236	4,885	5,656	771									
Virginia.....	1909	11	28	10	2	16	141	97	1	6	54	67	13									
	1904	4	9	6	.....	3	14	.....	.....	1	16	20	4						
	1899	10	20	12	.....	8	48	15	.....	2	40	52	12							
Washington.....	1909	97	978	58	185	735	2,203	2,277	199	457	5,676	7,271	1,595									
	1904	88	502	60	68	374	987	871	61	219	2,392	2,993	601									
	1899	60	237	66	35	146	526	304	27	81	932	1,190	268									
Wisconsin.....	1909	2,630	5,161	1,864	434	2,863	16,467	9,786	217	1,877	48,006	53,843	5,837									
	1904	2,360	4,479	1,858	323	2,298	15,276	5,897	69	1,328	26,406	29,995	3,589									
	1899	2,018	3,732	1,538	414	1,780	12,413	4,918	70	893	16,624	20,120	3,496									
Wyoming.....	1909	4	27	.....	7	20	79	115	11	17	211	269	68								
	1904	6	17	3	3	11	83	38	3	7	95	114	19									
	1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	1909	7	15	8	.....	7	42	20	.....	7	50	71	21							
	1904	27	398	17	38	343	645	1,146	37	151	1,465	1,871	406									
	1899	27	65	13	12	40	173	79	6	13	108	151	43									

1 Figures can not be shown without disclosing individual operations.
 2 Less than \$500.
 3 Excluding statistics for 1 establishment, to avoid disclosure of individual operations.
 4 Excluding statistics for 2 establishments, to avoid disclosure of individual operations.

CANNING AND PRESERVING

CANNING AND PRESERVING.

GENERAL STATISTICS.

Summary for the four branches of the industry: 1909.—Table 1 presents a summary of the statistics of the canning and preserving industry as a whole for 1909. It also distinguishes four classes of establishments: (1) Establishments whose chief products are canned and preserved fruits and vegetables, including dried and packed fruits put up by packing houses; (2) establishments whose chief products are canned and cured fish, including pickled, smoked, and dried fish; (3) establishments whose chief products are canned oysters and clams; (4) establishments whose chief products are pickles, preserves, jellies, sauces, etc.

The general statistics for the industry do not cover the canning of meats, soups, or other products by meat-packing establishments, statistics for which are included with those for the slaughtering and meat-packing industry. Data as to the quantity of canned and preserved fruits, vegetables, and fish produced as subsidiary or incidental products in the meat-packing or other industries are, however, shown in the footnotes to Table 17. The drying and packing of fruits and vegetables when done on the farm by the grower is not included, the value of the products so prepared on farms being covered by the census of agriculture. The shucking of oysters, except as done in connection with canning, is not considered as properly within the scope of the census of manufactures.

In making up the statistics for the four branches of the industry named, each establishment has been assigned according to its product of chief value. Some of the establishments are engaged in the canning of fruits and vegetables in the summer and fall months and in the canning and preserving of fish and oysters at other times; and large quantities of pickles, preserves, and sauces are made by establishments engaged primarily in canning vegetables. This overlapping makes it advisable to present in most of the tables only totals for all establishments in the four branches of the industry combined.

In 1909 the establishments in the industry as a whole gave employment on the average to 71,972 persons, of whom 59,968 were wage earners, and paid out \$26,945,466 in salaries and wages.

In the canning and preserving industry the cost of materials constitutes a large proportion of the total value of products, the processes of manufacture being relatively simple and inexpensive. The combined cost of the materials used by all four branches of the industry in 1909 was \$101,823,059, which is equal to 64.8 per cent of the total value of products

(\$157,101,201), while the value added by manufacture (that is, the value of products less the cost of materials) was \$55,278,142.

	Total for the industry.	ESTABLISHMENTS ENGAGED PRIMARILY IN CANNING AND PRESERVING—			
		Fruits and vegetables.	Fish.	Oysters.	Pickles, preserves, and sauces.
Number of establishments.....	3,767	2,789	328	70	580
Persons engaged in the industry.....	71,972	47,448	8,341	2,873	13,310
Proprietors and firm members.....	4,244	3,316	338	49	541
Salaried employees.....	7,760	3,640	743	158	3,219
Wage earners (average number).....	59,968	40,492	7,260	2,666	9,550
Primary horsepower.....	81,179	59,950	6,969	1,423	12,837
Capital.....	\$119,207,127	\$67,313,424	\$18,796,180	\$3,647,136	\$29,450,387
Expenses.....	141,486,156	83,771,512	22,091,016	2,429,579	33,194,049
Services.....	26,945,466	15,090,277	3,985,512	669,441	7,200,236
Salaries.....	7,863,623	3,318,579	894,559	195,360	3,455,125
Wages.....	19,081,843	11,771,698	3,090,953	474,081	3,745,111
Materials.....	101,823,059	62,543,622	15,911,335	1,570,705	21,797,397
Miscellaneous.....	12,717,631	6,137,613	2,194,169	189,433	4,196,416
Value of products.....	157,101,201	91,439,161	25,514,436	2,813,857	37,333,747
Value added by manufacture (value of products less cost of materials).....	55,278,142	28,895,539	9,603,101	1,243,152	15,536,350

Of the 3,767 establishments canvassed in 1909, nearly three-fourths (2,789) were engaged primarily in the canning and preserving of fruits and vegetables, these establishments contributing products to the value of \$91,439,161, or 58.2 per cent of the total for the industry as a whole. Establishments engaged chiefly in the canning and curing of fish formed approximately one-eleventh of the total number, and the value of their products represented 16.2 per cent of the total for all four branches. The 70 establishments engaged chiefly in oyster canning contributed 1.8 per cent of the total value of all products; and those establishments whose chief products were pickles, preserves, and sauces, which formed about one-seventh of the total number, contributed 23.8 per cent of the total value.

In the case of establishments engaged primarily in canning fruits and vegetables the cost of materials represented 68.4 per cent of the value of products; in the case of those handling fish principally, 62.4 per cent; of those chiefly canning oysters and clams, 55.8 per cent; and of those making chiefly pickles, preserves, and sauces, 58.4 per cent. It should be noted that the cost of cans and other containers is an important factor in the cost of materials.

Comparison with earlier censuses, for the industry as a whole.—Table 2 summarizes the statistics for the canning and preserving industry as a whole for each census from 1889 to 1909, inclusive.

Table 2

	CANNING AND PRESERVING—ALL BRANCHES COMBINED.							
	Number or amount.				Per cent of increase. ¹			
	1909	1904	1899	1889	1899-1909	1904-1909	1899-1904	1889-1899
Number of establishments.....	3,767	3,168	2,570	1,312	46.6	18.9	23.3	95.9
Persons engaged in the industry.....	71,972	66,022	(²)	(²)	.....	9.0	.....	.....
Proprietors and firm members.....	4,244	3,450	(²)	(²)	.....	23.0	.....	.....
Salaries employees.....	7,760	5,628	4,199	(²)	84.8	37.9	34.0	.....
Wage earners (average number).....	59,968	56,944	57,012	58,359	5.2	5.3	-0.1	(³)
Primary horsepower.....	81,179	60,831	38,624	20,690	110.2	33.4	57.5	86.7
Capital.....	\$119,207,127	\$79,245,880	\$55,480,983	\$23,415,619	114.9	50.4	42.8	136.9
Expenses.....	141,486,156	115,539,183	86,327,718	39,062,459	63.9	22.5	33.8	.....
Services.....	26,945,466	21,567,056	17,183,832	8,259,422	56.8	24.9	25.5	.....
Salaries.....	7,863,623	5,230,704	3,478,727	(²)	126.0	50.3	50.4	.....
Wages.....	19,081,843	16,336,352	13,705,105	(²)	39.2	16.8	19.2	.....
Materials.....	101,823,059	83,147,336	63,667,568	28,704,413	59.9	22.5	30.6	121.8
Miscellaneous.....	12,717,631	10,824,791	5,476,318	2,098,624	132.2	17.5	97.7	160.9
Value of products.....	157,101,201	130,465,976	99,335,464	46,625,539	58.2	20.4	31.3	113.0
Value added by manufacture (value of products less cost of materials).....	55,278,142	47,318,640	35,667,896	17,921,126	55.0	16.8	32.7	99.0

¹ A minus sign (—) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Figures not comparable.

³ Comparable figures not available.

Comparable statistics for the industry as a whole are not available for censuses prior to 1889. The canning and preserving of food products is an industry which lies on the border line between manufacture on the one hand, and agriculture and fishing on the other, and for this reason the several branches of the industry have not always been regarded in census reports as manufacturing business. In 1879 there were reported 520 establishments engaged in the canning and preserving of fruits and vegetables and the manufacture of pickles, preserves, and sauces, which gave employment to an average of 32,835 wage earners, and turned out products valued at \$20,006,918; but statistics for the canning and preserving of fish and oysters in 1879 are not available.

The value of products reported was more than three times as great in 1909 as in 1889, but part of the increase is attributable to the advance that has taken place in the price of the farm and sea products used as materials. The average number of wage earners reported shows little change from census to census, but the figures shown in the table for 1889 are far from comparable with those for later censuses.¹ The introduction of new and improved machinery has permitted an increase in output since 1899 without an increase

in wage earners; the horsepower reported, however, has increased greatly.

Comparison with earlier censuses for the four branches of the industry.—Table 3 shows, for the four branches of the industry separately, the most important items for 1909 and 1899 and the per cent of increase.

The canning and preserving of fruits and vegetables, the largest of the four branches of the industry, showed a marked increase during the decade 1899-1909 in all items except the average number of wage earners, for which the increase was only 8.9 per cent. The value of products increased 62 per cent. In fish canning and preserving there was a decrease of 35.5 per cent in the average number of wage earners, but this decrease was probably due in part to the erroneous inclusion in 1899 either of some of the fishermen engaged in the catching of fish or of some of the laborers engaged on contract work—that is, working for contractors and not employed directly by the manufacturer—for which work only the expenses should be reported. This branch of the industry shows the least relative increase of any of the four branches in value of products, but this may be accounted for in part by the great growth in the fish-canning industry in Alaska during the decade. No doubt a smaller proportion of the salmon catch of Alaska was sent to the states for use in the canneries in 1909 than in 1899. The oyster-canning branch, although the least important, shows by far the greatest percentages of increase during the decade. In 1909 there were approximately three times as many establishments as in 1899, twice as many wage earners, twice as great a value of products, and three times as great a value added by manufacture. The manufacture of pickles, preserves, and sauces shows an increase during the decade of 32.2 per cent in the average number of wage earners, 59 per cent in value of products, and 61.8 per cent in value added by manufacture.

¹ The main source of incomparability between the statistics of wage earners for 1889 and those for later years is found in the fact that the average number for 1889 was computed on the basis of the number of weeks or months each plant was in operation, while the average number for later censuses was computed on the basis of a full year's operation, even though the plant may have run only a short time. A plant running six months and employing continuously during that period 50 wage earners would have been reported in 1889 as having an average of 50, while at later censuses it would have been reported as having an average of 25. In the case of industries in which most establishments operate continuously, this change in the method of calculating the average number of wage earners has little effect upon the comparability of the statistics; but in the case of a seasonal industry like canning and preserving it has a very great effect. The figures for the average number of wage earners in 1889 in this industry are much larger than they would be if computed on the basis used at later censuses.

The industry is well distributed throughout the United States, being reported from 44 states and the District of Columbia in 1909.

California is by far the most important state in the canning and preserving industry, largely on account of its fruit products. The state ranked first at the censuses of 1909 and 1904 in value of products and value added by manufacture, but second in 1909 and third in 1904 in average number of wage earners. The establishments in California are on the average much larger than those in most other states, and doubtless the use of improved machinery accounts for the relatively small number of wage earners. The number of wage earners employed in the industry in the state decreased 5.4 per cent during the decade ending with 1909, but the value of products increased 120.3 per cent. New York ranked second in total value of products and value added by manufacture in 1909; Maryland ranked third in value of products and fifth in value added by manufacture, but first in wage earners; Pennsylvania ranked fifth in value of products and third in value added by manufacture; and Washington ranked fourth in both items.

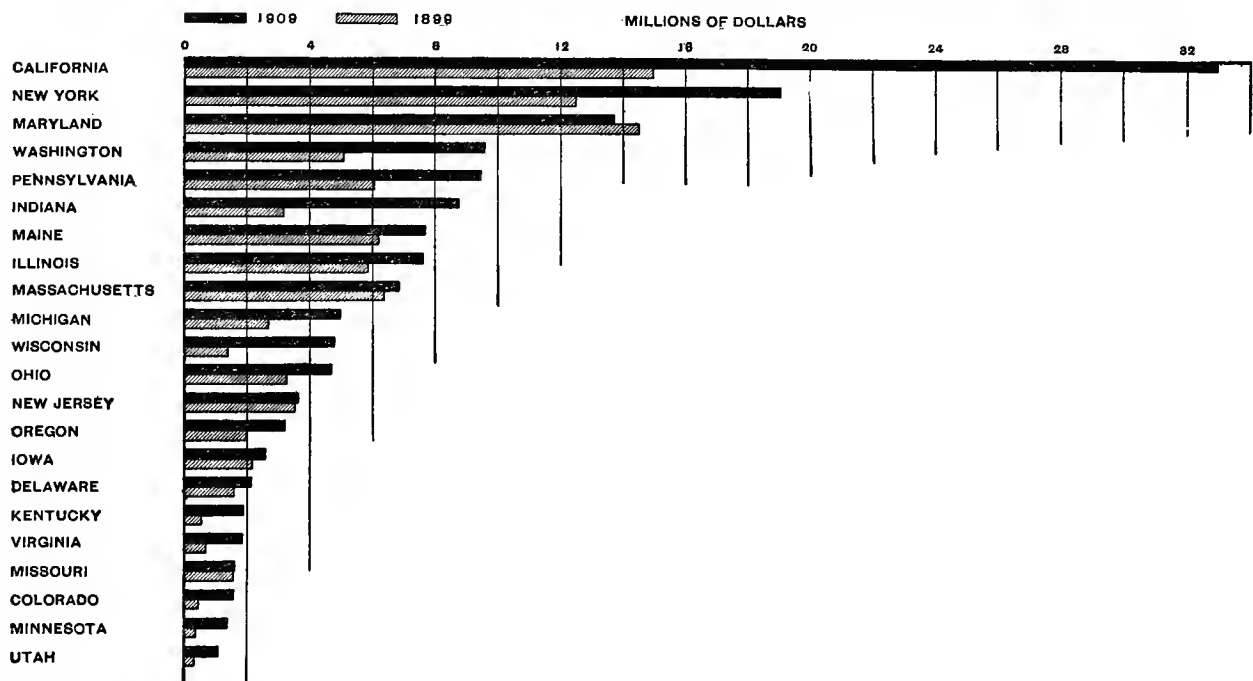
The majority of the more important states in the canning and preserving industry have the same or practically the same rank in value added by manu-

facture that they hold with respect to total value of products. Most of the states had the same or nearly the same rank as to value of products in 1909 as in 1904, showing that there has been no very conspicuous change in the geographic distribution of the industry. The state of Washington, however, because of the great increase in the fish-canning branch of the industry in that state, advanced from twelfth place in 1904 to fourth in 1909; and Mississippi, on account of the great decrease in the fish and oyster canning industry of the state, fell from sixteenth place in 1904 to twenty-fourth in 1909.

Of the 10 leading states in value of products, Indiana showed the most rapid increase in number of wage earners and value of products during the period from 1899 to 1909, the number of wage earners increasing 58.3 per cent, and the value of products 178.5 per cent. Still higher percentages of increase are shown for some of the states in which the industry has attained importance only during recent years, such as Minnesota, Colorado, Kentucky, and Wisconsin. Only 3 of the states for which the percentages are shown in Table 4 reported a smaller value of products in 1909 than in 1899, namely, Maryland, Mississippi, and West Virginia.

The diagram below shows graphically the value of products reported for the principal states in 1909 and 1899.

CANNING AND PRESERVING—VALUE OF PRODUCTS, FOR LEADING STATES: 1909 AND 1899.



Persons engaged in the industry.—Table 5 shows, for 1909, the number of persons engaged in the canning and preserving industry as a whole and in each of the four branches, classified according to occupational status, sex, and age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

In view of the seasonal nature of the industry, this method of calculation may give somewhat less accurate results in this case than for some of the other industries.

The average number of persons engaged in the canning and preserving industry during 1909 was 71,972, of whom 59,968, or 83.3 per cent, were wage earners; 6,920, or 9.6 per cent, proprietors

and officials; and 5,084, or 7.1 per cent, clerks and other subordinate salaried employees. Of the total number of persons engaged in the industry, 38,437, or 53.4 per cent, were males and 33,535, or 46.6 per cent, females. Of the wage earners, however, over half were females. The average number of children under 16 years of age reported as wage earners was 4,246, and the proportion (7.1 per cent) which this number formed of the total number of wage earners in the industry was exceeded by very few industries in 1909.

Table 5
BRANCH OF INDUSTRY AND CLASS OF PERSONS.

	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
Canning and preserving—All branches combined.....	71,972	38,437	33,535
Proprietors and officials.....	6,920	6,759	161
Proprietors and firm members.....	4,244	4,116	128
Salaried officers of corporations.....	968	951	17
Superintendents and managers.....	1,708	1,692	16
Clerks.....	5,084	4,028	1,056
Wage earners (average number).....	59,968	27,650	32,318
16 years of age and over.....	55,722	25,865	29,857
Under 16 years of age.....	4,246	1,785	2,461
Fruits and vegetables.....	47,448	23,496	23,952
Proprietors and officials.....	5,110	5,014	96
Proprietors and firm members.....	3,316	3,239	77
Salaried officers of corporations.....	607	599	8
Superintendents and managers.....	1,187	1,176	11
Clerks.....	1,846	1,434	412
Wage earners (average number).....	40,492	17,048	23,444
16 years of age and over.....	36,908	15,565	21,343
Under 16 years of age.....	3,584	1,483	2,101
Fish.....	8,341	5,314	3,027
Proprietors and officials.....	651	642	9
Proprietors and firm members.....	338	331	7
Salaried officers of corporations.....	127	125	2
Superintendents and managers.....	186	186	.....
Clerks.....	430	299	131
Wage earners (average number).....	7,260	4,373	2,887
16 years of age and over.....	7,085	4,277	2,808
Under 16 years of age.....	175	96	79
Oysters.....	2,873	1,449	1,424
Proprietors and officials.....	130	129	1
Proprietors and firm members.....	49	48	1
Salaried officers of corporations.....	34	34	.....
Superintendents and managers.....	47	47	.....
Clerks.....	77	69	8
Wage earners (average number).....	2,666	1,251	1,415
16 years of age and over.....	2,325	1,108	1,217
Under 16 years of age.....	341	143	198
Pickles, preserves, and sauces.....	13,310	8,178	5,132
Proprietors and officials.....	1,029	974	55
Proprietors and firm members.....	541	498	43
Salaried officers of corporations.....	200	193	7
Superintendents and managers.....	288	283	5
Clerks.....	2,731	2,226	505
Wage earners (average number).....	9,550	4,978	4,572
16 years of age and over.....	9,404	4,915	4,489
Under 16 years of age.....	146	63	83

The average number of wage earners for each state at the censuses of 1909, 1904, and 1899 is given in Table 22. The average number distributed by sex

and age is not shown for the individual states, but Table 23 distributes on this basis the number employed on December 15, or the nearest representative day. The largest number of women over 16 years of age, 14,600, was reported for the state of Maryland, where they formed 60 per cent of all wage earners over 16 years of age; and the next largest number, 9,483, for the state of New York. The employment of children under 16 years of age as wage earners was more or less common in nearly all of the states. The largest number of children was reported for the state of Maryland, where they formed 13.5 per cent of all wage earners, and the next largest for the state of Virginia, where they represented 21.7 per cent of all wage earners.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 6 for the industry as a whole.

Table 6
PERSONS ENGAGED IN THE INDUSTRY—ALL BRANCHES COMBINED.

CLASS.	1909				1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.			
Total.....	71,972	100.0	88,022	100.0	9.0		
Proprietors and firm members.....	4,244	5.9	3,450	5.2	23.0		
Salaried employees.....	7,760	10.8	5,628	8.5	37.9		
Wage earners (average number).....	59,968	83.3	56,944	86.2	5.3		

Salaried employees show the greatest percentage of increase. Wage earners increased only 5.3 per cent from 1904 to 1909.

Table 7 shows the average number of wage earners in the industry as a whole distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. As already explained, the distribution for 1909 is estimated on the basis of the actual numbers reported for a single representative day (see Introduction). The table shows comparatively little change in conditions from census to census, though the proportion of children was somewhat lower in 1909 and 1904 than in 1899.

Table 7
AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY—ALL BRANCHES COMBINED.

CLASS.	1909		1904		1899	
	Num. ber.	Per cent distribution.	Num. ber.	Per cent distribution.	Num. ber.	Per cent distribution.
Total.....	59,968	100.0	58,944	100.0	57,012	100.0
16 years and over.....	65,722	92.9	52,932	93.0	52,277	91.7
Male.....	25,865	43.1	25,518	44.8	25,839	45.3
Female.....	29,857	49.8	27,414	48.1	26,438	46.4
Under 16 years of age.....	4,246	7.1	4,012	7.0	4,735	8.3

Wage earners employed, by months.—Table 8 gives, for the industry as a whole, the number of wage earners employed on the 15th (or nearest represent-

ative day) of each month during the year 1909 for the 22 states in which at least 500 wage earners were employed during the year.

STATE.	Average number during the year.	MONTHS											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	59,968	19,998	21,268	23,015	28,390	31,139	45,270	68,516	127,741	154,800	105,267	69,727	34,536
California.....	7,757	2,854	<i>2,781</i>	2,870	3,878	5,063	6,808	11,567	18,047	14,781	12,952	8,951	4,542
Colorado.....	518	160	159	<i>167</i>	167	193	600	1,049	1,161	938	744	479	423
Delaware.....	1,369	<i>11</i>	30	87	975	524	513	6,413	6,413	2,650	397	52	
Illinois.....	2,383	<i>1,015</i>	1,140	1,218	1,801	1,873	1,999	3,905	8,538	4,392	2,231	1,593	
Indiana.....	3,406	<i>769</i>	909	989	1,104	1,073	2,942	2,505	7,638	11,600	6,925	2,678	1,750
Iowa.....	1,247	221	<i>217</i>	253	310	296	389	581	4,601	6,642	1,482	576	393
Kentucky.....	653	<i>262</i>	269	274	298	293	345	447	1,730	1,778	1,183	515	437
Louisiana.....	974	1,185	1,171	1,187	1,208	602	377	438	1,066	1,184	1,213	931	1,118
Maine.....	3,850	<i>688</i>	668	885	3,354	4,375	4,012	3,392	4,975	10,131	7,355	5,363	1,100
Maryland.....	8,613	<i>1,227</i>	2,013	2,086	2,640	3,441	5,884	6,194	25,192	31,131	16,014	4,799	2,730
Massachusetts.....	1,449	1,432	1,430	1,467	1,278	<i>1,220</i>	1,240	1,352	1,291	1,548	1,789	1,710	1,655
Michigan.....	2,073	<i>654</i>	660	758	820	961	1,681	3,506	3,144	4,172	3,736	3,298	1,484
Mississippi.....	847	1,182	1,027	1,154	1,209	<i>140</i>	187	211	524	859	993	1,314	1,358
Missouri.....	952	<i>178</i>	183	199	203	220	224	410	3,443	4,587	1,163	341	256
New Jersey.....	1,818	<i>273</i>	317	290	396	760	1,662	1,483	3,344	6,021	4,768	1,566	937
New York.....	7,075	2,149	<i>2,058</i>	2,125	2,070	2,305	4,180	10,977	10,078	13,656	15,475	13,423	6,418
Ohio.....	2,009	598	609	587	<i>581</i>	636	1,686	1,778	5,671	5,888	3,686	1,451	957
Oregon.....	661	116	<i>118</i>	172	277	524	874	1,102	921	1,588	1,250	580	419
Pennsylvania.....	2,753	<i>1,347</i>	2,085	2,053	2,061	2,149	2,691	3,077	3,792	4,082	3,851	2,723	2,615
Virginia.....	1,860	<i>181</i>	184	353	850	901	518	994	6,644	7,469	3,623	372	237
Washington.....	2,029	<i>483</i>	648	1,015	1,882	2,233	2,291	3,725	3,972	2,926	2,496	1,772	917
Wisconsin.....	1,776	<i>292</i>	313	382	612	904	1,280	5,560	5,455	2,536	1,363	931	688

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The industry is largely a seasonal one. In the United States as a whole, the largest number of wage earners reported for any month of 1909 was 154,800, in September, and the smallest number, 19,998, in January, the latter number being equal to only 12.9 per cent of the former. In 1904, when the average number was reported, the maximum number, 154,127, was reported for September, and the minimum number, 18,968, forming 12.3 per cent of the maximum, for February. The height of the employment in the industry is naturally reached during the summer and fall months when fruits and vegetables, the canning and preserving of which forms the great bulk of the business, are available. September was the month of maximum employment in 14 of the 22 states listed in the table, October in 3, and August in 3. For Mississippi, where the work was largely confined to the oyster-canning branch, December was the month of maximum employment. The months of maximum and minimum employment for 1909, and the numbers of wage earners reported for such months, are given for each state in Table 23.

Prevailing hours of labor.—In Table 9 the wage earners in the industry as a whole are classified according to the prevailing hours of labor per week in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total, according to the hours prevailing in that establishment. Figures are given for the 22 states in which an average of 500 wage earners were employed during 1909.

STATE.	In establishments with prevailing hours—							
	Total.	48 and under.	Between 48 and 54.		60.	Between 60 and 72.	72 and over.	
			54.	Between 54 and 60.				
United States.....	59,968	2,632	1,311	3,077	4,641	42,908	2,904	2,495
California.....	7,757	332	53	428	147	6,083	514	200
Colorado.....	518	48		24	3	436	7	
Delaware.....	1,369	45	10	12	42	1,097	133	30
Illinois.....	2,383	61	153	74	276	1,672		147
Indiana.....	3,406	211	55	39	616	2,485		
Iowa.....	1,247	69		11	4	1,061		102
Kentucky.....	653	58		67	95	419	14	
Louisiana.....	974	24		13	2	517	317	101
Maine.....	3,850	10		123	79	3,617	4	17
Maryland.....	8,613	223	317	90	126	6,192	616	1,049
Massachusetts.....	1,449	66	94	1,103	154	32		
Michigan.....	2,073	6		58	373	1,589	15	32
Mississippi.....	847	11		125	32	681	98	
Missouri.....	952	217	23	23	30	651	8	
New Jersey.....	1,818	149	82	97	485	988	10	7
New York.....	7,075	381	279	191	735	5,269	156	64
Ohio.....	2,009	208	18	79	149	1,555		
Oregon.....	661	15	28	134		280	172	32
Pennsylvania.....	2,753	9	7	23	332	1,806	73	8
Virginia.....	1,860	80	82	34	43	1,542	19	60
Washington.....	2,029	101		24	58	1,359	469	18
Wisconsin.....	1,776		47	13	125	1,051	217	323

In the United States as a whole more than four-fifths (80.6 per cent) of the wage earners in the industry in 1909 worked in establishments where the prevailing number of hours was 60 or more than 60 per week. Only 6.6 per cent were employed in establishments where the usual hours were less than 54 per week. The largest number of wage earners, 42,908, or 71.6 per cent of the total, were employed in establishments operating 60 hours per week. In all of the states for which separate data are shown, 60 hours per week was the most common time of employment, except in Mas-

sachusetts, where the most common number of hours was 54 per week.

Character of ownership.—Table 10 presents data with respect to the character of ownership of establishments in the canning and preserving industry for the United States.

CHARACTER OF OWNERSHIP.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
	Total.....	3,767	3,188	\$167,101,201	$130,465,978
Individual.....	1,636	1,372	21,321,533	18,484,471
Firm.....	939	836	18,445,128	33,097,382
Corporation.....	1,167	940	116,496,603	78,308,836
Other.....	25	20	837,937	575,287
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	43.4	43.3	13.6	14.2
Firm.....	24.9	26.4	11.7	25.4
Corporation.....	31.0	29.7	74.2	60.0
Other.....	0.7	0.6	0.5	0.4

The most important distinction shown is that between corporate and all other forms of ownership. Of the entire number of establishments reported for the

industry in 1909, 31 per cent were under corporate ownership. The corresponding figure for 1904 was 29.7 per cent. While corporations thus controlled less than one-third of the total number of establishments at each census, the value of their products represented 74.2 per cent of the total for the industry in 1909 and 60 per cent in 1904. These figures show that even during this short period of five years the corporate form of ownership increased so greatly that it represented a materially larger proportion of the industry in 1909 than in 1904.

Of the 25 establishments shown in 1909 as operated under forms of ownership other than individual, firm, or corporate, 24 were controlled by cooperative associations.

Table 11 gives, for 1909, statistics for establishments classified according to form of ownership for each state in which 500 or more wage earners were reported in this industry. The 25 establishments controlled by miscellaneous forms of ownership have in this table been included with those under corporate ownership.

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
California.....	43	34	119	578	383	6,796	1,660,264	1,613,248	29,641,317	601,530	428,489	7,875,588
Colorado.....	5	5	20	13	22	483	48,952	150,975	1,327,852	21,685	69,029	764,638
Delaware.....	34	30	13	473	500	396	794,816	816,099	495,030	218,787	200,023	153,639
Illinois.....	45	24	43	264	504	1,615	685,092	1,642,999	5,291,495	273,374	619,071	1,914,445
Indiana.....	22	17	95	245	160	3,001	589,496	380,051	7,788,796	202,038	88,895	2,522,749
Iowa.....	17	5	49	125	45	1,077	178,250	46,493	2,324,634	89,792	20,166	871,530
Kentucky.....	4	2	30	69	(X)	584	84,921	(X)	1,771,964	89,273	(X)	734,281
Louisiana.....	8	5	13	21	21	922	47,538	58,647	871,578	25,421	25,868	353,376
Maine.....	91	63	91	447	668	2,735	755,899	1,173,117	5,759,817	306,158	403,749	1,854,008
Maryland.....	263	166	39	2,461	3,096	3,096	3,603,787	4,301,499	5,804,163	969,266	1,208,659	1,441,890
Massachusetts.....	36	12	23	238	201	1,010	989,751	1,099,696	4,750,859	274,056	268,759	1,714,594
Michigan.....	48	19	37	367	91	1,615	729,721	223,557	4,017,693	264,266	83,395	1,549,330
Mississippi.....	2		9	(X)		847	(X)		824,233	(X)		316,391
Missouri.....	67	87	8	125	235	592	162,889	164,096	1,246,850	64,430	59,744	444,652
New Jersey.....	40	17	27	264	324	1,230	885,309	697,278	2,081,511	330,820	233,990	891,199
New York.....	475	188	127	1,692	873	4,510	4,670,491	2,572,313	11,796,931	1,590,580	1,222,197	4,558,173
Ohio.....	31	21	55	190	306	1,513	527,727	715,194	3,416,733	169,571	257,812	1,130,112
Oregon.....	23	13	35	82	54	525	181,279	143,816	2,881,965	79,196	63,042	877,390
Pennsylvania.....	39	25	19	411	191	2,151	1,169,232	606,849	7,707,945	366,939	187,001	4,265,553
Virginia.....	189	116	20	841	684	335	925,021	660,697	268,600	300,577	230,019	115,455
Washington.....	17	5	58	170	38	1,821	672,497	404,571	8,518,319	299,573	238,370	4,011,921
Wisconsin.....	15	10	58	147	51	1,578	511,363	177,485	4,118,606	162,436	78,417	1,599,854

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for corporations include those for the few comparatively unimportant establishments operated by cooperative associations or under other miscellaneous forms of ownership.

In 1909, of the entire number of wage earners reported, 10,571, or 17.6 per cent of the total, were employed in establishments under individual ownership; 9,154, or 15.3 per cent, in those under firm ownership; and 40,243, or 67.1 per cent, in those shown under corporate ownership.

There was considerable variation among the states in the relative importance of the establishments operated by individuals, firms, and corporations, respectively. Thus, in California, the principal state in the industry, establishments controlled by cor-

porations constituted 60.7 per cent of the total number of establishments, gave employment to 87.6 per cent of the wage earners, and reported 90.1 per cent of the value of products. In Maryland, on the other hand, corporations controlled only 8.3 per cent of the establishments, and these establishments gave employment to 35.5 per cent of the wage earners, and contributed 42.3 per cent of the value of products. The difference is due to the fact that Maryland contains a much larger number of comparatively small establishments than are found in California.

Size of establishments.—Table 12, relating to the entire industry in the United States, presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

their products amounted to only 9.8 per cent of the total. The great bulk of the value of products of the industry was reported by establishments having products valued at \$100,000 or over, such establishments reporting 66.7 per cent of the total value of products in 1909.

The average value of products per establishment increased from \$41,182 in 1904 to \$41,705 in 1909, but the average value added by manufacture (computed from Table 2) decreased from \$14,936 to \$14,674. The average number of wage earners per establishment decreased from 18 in 1904 to 15.9 in 1909. The decrease in the average number of wage earners and the small increase in average value of products per establishment are due, no doubt, to the increase in the relative number of small establishments, in which proprietors and firm members largely take the place of wage earners, this increase, in turn, being perhaps due to a more complete canvass in 1909 than in 1904.

There are decided differences among the four branches of the industry with respect to size of establishments. In 1909 the average value of products per establishment for those handling principally fruits and vegetables was \$32,786; handling fish, \$77,788; canning oysters and clams, \$40,198; and making pickles, preserves, and sauces, \$64,369.

In some respects, and especially from the standpoint of conditions under which persons engaged in manufacturing work, the best classification of establishments to bring out the feature of size is a classification according to the average number of wage earners employed. Table 13 gives such a classification of the factories in the industry as a whole in each of the 22 states in which an average of 500 or more wage earners were employed in 1909.

Table 12

CANNING AND PRESERVING—ALL BRANCHES COMBINED.

VALUE OF PRODUCTS PER ESTABLISHMENT.	CANNING AND PRESERVING—ALL BRANCHES COMBINED.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	3,767	3,168	\$157,101,201	\$130,465,978
Less than \$5,000.....	1,394	1,064	3,105,206	2,484,338
\$5,000 and less than \$20,000.....	1,176	1,037	12,221,763	10,908,297
\$20,000 and less than \$100,000.....	840	746	36,858,716	33,920,441
\$100,000 and less than \$1,000,000.....	344	315	81,447,022	71,346,065
\$1,000,000 and over.....	13	6	23,468,494	11,806,835
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	37.0	33.6	2.0	1.9
\$5,000 and less than \$20,000.....	31.2	32.7	7.8	8.4
\$20,000 and less than \$100,000.....	22.3	23.5	23.5	26.0
\$100,000 and less than \$1,000,000.....	9.1	9.9	51.3	54.7
\$1,000,000 and over.....	0.3	0.2	14.9	9.0

Of the 3,767 establishments reported for 1909, only 13, or three-tenths of 1 per cent, manufactured products valued at \$1,000,000 or over. In 1904 there were 6 establishments of this class. While such establishments represented a very small proportion of the entire number of establishments at both censuses, they reported a much larger proportion of the value of products, 14.9 per cent in 1909 and 9 per cent in 1904. Every other group, except that of establishments with products valued at less than \$5,000, showed a smaller proportion of the total value of products in 1909 than in 1904.

The smaller establishments—that is, those manufacturing products valued at less than \$20,000—constituted more than two-thirds (68.2 per cent) of the entire number of establishments in 1909, but the value of

Table 13

CANNING AND PRESERVING—ALL BRANCHES COMBINED.

STATE.	Establishments employing in 1909—																			
	Total.		No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Estab-lish-ments.	Wage earners (av. number).	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.....	3,767	69,968	92	1,890	4,760	1,125	12,815	428	14,015	145	10,504	69	9,700	17	5,769	2	1,101	1	1,314	
California.....	196	7,757	4	37	96	58	701	51	1,796	29	2,069	13	1,918	4	1,175					
Colorado.....	30	518	2	13	38	8	105	3	107	4	268									
Delaware.....	77	1,369	1	8	28	49	626	15	467	4	248									
Illinois.....	118	2,383	10	46	140	29	322	19	664	9	710	5	547							
Indiana.....	134	3,406		29	99	58	643	33	1,039	11	756	2	376	1	494					
Iowa.....	71	1,247	4	17	52	30	402	18	623	3	62	1	118							
Kentucky.....	36	653		7	23	22	245	4	150	3	235									
Louisiana.....	26	974	2	9	26	6	68	2	79	4	352	3	449							
Maine.....	245	3,850	3	116	312	90	1,007	26	913	5	361	3	381	1	321	1	575			
Maryland.....	468	8,613	9	171	594	208	2,326	50	1,483	14	1,024	12	1,790	4	1,396					
Massachusetts.....	71	1,449	5	35	85	17	217	10	330	2	136	1	158	1	493					
Michigan.....	104	2,073	4	57	156	20	279	13	425	4	273	5	605	1	335					
Mississippi.....	11	847		1	4	2	20	2	57	3	239	2	243	1	284					
Missouri.....	222	952	5	173	367	41	387	2	47			1	151							
New Jersey.....	84	1,618		34	101	27	315	15	644	4	288	4	570							
New York.....	790	7,075	9	579	1,112	129	1,368	47	1,580	17	1,306	8	1,153			1	526			
Ohio.....	107	2,009	1	43	137	38	438	18	596	4	304	2	271	1	263					
Oregon.....	71	661	1	46	118	17	228	5	172	2	143									
Pennsylvania.....	83	2,753	4	44	119	20	203	7	263	4	277	2	308	1	260			1	1,314	
Virginia.....	325	1,860	9	232	607	71	728	11	309	1	60	1	156							
Washington.....	80	2,029	2	22	70	35	444	15	484	4	302			2	729					
Wisconsin.....	63	1,776	4	16	41	36	484	18	583	7	441	2	227							

It should be borne in mind in considering this table that, because of the seasonal character of the industry, the average number of employees of any given establishment for the entire year is usually much less than the maximum number or than the average number during the period of actual operation. (See Introduction.) Moreover, the fact that some establishments operate during a much longer period than others affects the significance of the distribution according to average number employed for the year.

Of the 3,767 establishments reported in 1909, 92, or 2.4 per cent, employed no wage earners; 50.2 per cent employed, on the average, from 1 to 5; and 29.9 per cent from 6 to 20. There were 145 establishments that employed an average of from 51 to 100 wage earners, and 89 establishments that employed over 100. There were 2 establishments reporting between 501 and 1,000, 1 each in Maine and New York, and 1, in Pennsylvania, having an average of more than 1,000.

Of the total number of wage earners (average number for the year), 29.3 per cent were reported by establishments employing, on the average, from 1 to 20; 23.4 per cent by establishments employing from 21 to 50; and 47.3 per cent by establishments employing more than 50 wage earners.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of depreciation, and consequently can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported.

Table 23 shows the total expenses reported for the industry as a whole in 1909 to have been \$141,486,156, divided as follows: Materials, \$101,823,059, or 72 per cent; wages, \$19,081,843, or 13.5 per cent; salaries, \$7,863,623, or 5.6 per cent; and miscellaneous expenses, made up of advertising, traveling expenses, ordinary repairs of buildings and machinery, and other sundry expenses, \$12,717,631, or 9 per cent. These proportions, as may be seen by comparing the items in Table 23, vary somewhat in the several states because of differences in local conditions, particularly in respect to the branch of the industry which predominates. In the United States as a whole in 1909 the distribution of the total reported expenses of establishments engaged primarily in canning and preserving fruits and vegetables was as follows: Cost of materials, 74.7 per cent; wages, 14.1 per cent; salaries, 4 per cent; and miscellaneous expenses, 7.3 per cent. For establishments engaged chiefly in canning and preserving fish the corresponding proportions were 72 per cent, 14 per cent, 4 per cent, and 9.9 per cent, respectively. For establishments engaged chiefly in canning oysters the corresponding percentages were

64.6, 19.5, 8, and 7.8, respectively. For those chiefly manufacturing pickles, preserves, and sauces they were 65.7, 11.3, 10.4, and 12.6, respectively.

Engines and power.—Table 14 shows, for the canning and preserving industry as a whole, the number of engines or other motors, according to their character, used in generating power (including electric motors operated by purchased current), and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments.

Table 14

CANNING AND PRESERVING—ALL BRANCHES COMBINED.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
	Primary power, total	4,087	2,812	1,623	81,179	60,831	38,624	100.0	100.0	100.0
Owned.....	3,203	2,557	1,623	75,309	58,544	36,919	92.8	96.2	95.6
Steam.....	2,587	2,292	1,537	70,362	56,065	35,990	86.7	92.2	93.2
Gas.....	595	242	72	4,519	1,962	598	5.6	3.2	1.5
Water wheels.....	16	12	14	364	378	219	0.4	0.6	0.6
Water motors.....	5	11	(¹)	34	82	(¹)	(²)	(²)	0.1
Other.....				30	57	112	(²)	(²)	0.1
Rented.....	884	255	(¹)	5,870	2,287	1,705	7.2	3.8	4.4
Electric.....	884	255	(¹)	5,469	1,776	623	6.7	2.9	1.6
Other.....				401	511	1,082	0.5	0.8	2.8
Electric motors	1,410	384	49	8,728	3,150	1,542	100.0	100.0	100.0
Run by current generated by establishment.....	526	129	49	3,259	1,374	919	37.3	43.6	59.6
Run by rented power..	884	255	(¹)	5,469	1,776	623	62.7	56.4	40.4

¹ Not reported.² Less than one-tenth of 1 per cent.

The total primary power used in the industry increased from 38,624 horsepower in 1899 to 81,179 in 1909, or 110.2 per cent. In 1909, as in 1904 and 1899, steam power constituted the bulk of the primary power, but, in spite of an increase of almost 100 per cent during the decade 1899–1909, steam power constituted a smaller proportion of the total in 1909 than in 1899. There was a marked increase in the power of gas and other internal-combustion engines, from 598 horsepower in 1899 to 4,519 in 1909. The use of water power is insignificant in this industry. There was a considerable increase, 777.8 per cent, between 1899 and 1909 in the horsepower of electric motors operated by purchased current (rented electric power), its proportion of the total primary power rising from 1.6 per cent to 6.7 per cent. The number and horsepower of electric motors operated by current generated in the establishments in this industry also show a decided increase.

Table 15 shows for 1909 the amount of each of the several kinds of power and of fuel used in the canning and preserving industry in the 22 leading states.

In 1909 the largest amounts of power were reported for New York, California, Maryland, Indiana, Wisconsin, Maine, Illinois, and Ohio, in the order

named. The total primary power for these states in 1909 amounted to 51,146 horsepower, or 63 per cent of the total for the United States. In every state steam power was much the most important kind employed. New York led in the amount of gas-engine

power, with 2,297 horsepower, or 50.8 per cent of the total for this kind in the entire country. Rented electric power was reported for all of the 22 states except Kentucky, but the largest amount, 1,697 horsepower, is shown for California.

Table 15

CANNING AND PRESERVING—ALL BRANCHES COMBINED: 1909

STATE.	CANNING AND PRESERVING—ALL BRANCHES COMBINED: 1909																
	Primary horsepower.							Electric horsepower.		Fuel used.							
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gas-oil (barrels).	Gas (1,000 feet).
Total.			Steam engines.	Gas engines.	Water wheels and motors.	Oth-er.	Elec-tric.	Oth-er.	Anthra-cite (long tons).			Bitumi-nous (short tons).					
United States.....	2,441	81,179	76,309	70,362	4,619	398	30	6,469	401	8,728	3,259	37,813	287,294	2,156	62,276	165,042	130,434
California.....	161	7,453	5,756	5,580	176	.....	.....	1,697	.....	1,803	106	83	1,797	.....	3,629	141,958	12,816
Colorado.....	27	1,349	1,199	1,187	12	.....	.....	150	.....	160	10	.....	8,442	.....	14	220	.....
Delaware.....	74	1,725	1,689	1,679	10	.....	.....	36	.....	37	1	50	4,252	.....	1,424	315	522
Illinois.....	94	4,305	3,966	3,846	120	.....	.....	307	32	544	237	272	24,891	63	213	375	6,279
Indiana.....	128	6,398	6,062	5,967	95	.....	.....	286	50	977	691	.....	37,085	70	274	489	895
Iowa.....	66	2,989	2,887	2,870	17	.....	.....	102	.....	154	52	2	8,770	.....	190	79	130
Kentucky.....	35	907	907	907	.....	.....	.....	.....	.....	156	156	.....	6,583	12	43	10	30
Louisiana.....	20	659	624	460	164	.....	.....	35	.....	43	8	.....	2,024	4	516	3,670	85
Maine.....	145	4,355	4,288	4,079	149	60	.....	31	36	277	246	1,417	15,741	37	3,238	502	.....
Maryland.....	314	7,007	6,928	6,741	187	.....	.....	29	50	85	56	69	27,721	108	7,662	2,773	2,844
Massachusetts.....	35	1,043	767	708	28	1	30	226	50	494	268	658	3,984	4	291	8	793
Michigan.....	75	3,374	3,131	3,034	97	.....	.....	243	.....	444	201	258	20,047	535	2,332	123	120
Mississippi.....	11	378	368	360	8	.....	.....	10	.....	15	5	.....	1,996	18	1,794	158	434
Missouri.....	73	974	916	873	43	.....	.....	58	.....	68	10	.....	3,447	.....	2,525	217	1,143
New Jersey.....	70	2,698	2,645	2,517	103	25	.....	53	.....	77	24	2,130	6,888	.....	184	423	676
New York.....	475	12,469	11,402	8,846	2,297	259	.....	932	135	1,087	155	26,979	34,934	727	693	2,134	21,383
Ohio.....	102	4,244	4,050	3,877	173	.....	.....	191	3	282	91	62	14,570	375	220	101	56,428
Oregon.....	45	1,318	1,159	1,136	19	4	.....	159	.....	163	4	18	122	.....	7,520	8,688	.....
Pennsylvania.....	64	3,474	3,325	3,168	143	14	.....	149	.....	843	694	4,534	23,392	.....	51	83	19,211
Virginia.....	83	1,382	1,378	1,365	13	.....	.....	4	.....	4	.....	.....	131	2,391	28	5,122	399
Washington.....	64	2,433	2,242	1,919	317	6	.....	191	.....	314	123	4	8,726	60	14,553	1,631	2,796
Wisconsin.....	69	4,915	4,500	4,249	251	.....	.....	415	.....	494	79	355	13,444	.....	537	586	330
All other states.....	211	6,330	5,120	4,994	97	29	.....	165	45	207	42	364	16,047	127	9,367	308	3,351

Fuel consumed.—As shown by Table 15, bituminous coal was the principal kind of fuel used, 287,294 short tons being consumed during 1909. A large quantity of anthracite coal was reported as consumed in the factories in New York. Large amounts of oil and

natural gas were also used in some states. California reported 86 per cent of the total quantity of oil used in the country, and the greatest quantity of gas, representing 43.3 per cent of the total, was reported for the factories of Ohio.

SPECIAL STATISTICS AS TO PRODUCTS.

The special schedule used in collecting the statistics for the canning and preserving industry required a detailed report of the quantity and value of the different products manufactured, with the exception of pickles, preserves, and sauces. As already stated, there is considerable overlapping among the four branches of the canning and preserving industry. Consequently, in presenting data as to specific products, it is best not to segregate the branches, but to show the total quantity and value of each product made by all the establishments which produce that

product, to whatever branches of the industry they may be assigned.

The United States as a whole.—Table 16 presents a summary, by broad classes, of the quantity and value of the products of the establishments in the canning and preserving industry for 1909 and 1899. Data as to similar products reported as made by establishments assigned to other industries appear in the footnotes to Table 17. The total value of such products reported by such establishments in 1909 was \$5,423,199.

Table 16

CLASS OF PRODUCTS.	QUANTITY.		VALUE OF PRODUCTS.		PER CENT OF TOTAL VALUE OF PRODUCTS.		PER CENT OF INCREASE.	
	1909	1899	1909	1899	1909	1899	Quantity.	Value.
Total.....			\$167,101,201	\$98,335,484	100.0	100.0	.....	58.2
Canned vegetables (cases).....	32,752,469	19,323,730	51,688,914	28,734,598	32.8	28.9	69.6	79.5
Canned fruits (cases).....	5,601,404	4,467,817	12,938,474	11,311,062	8.2	11.4	23.1	14.4
Dried fruits (pounds).....	400,328,767	85,439,408	19,840,395	4,757,005	12.6	4.8	368.7	317.1
Canned fish and oysters (pounds).....	235,418,713	(1)	17,673,311	12,868,572	11.2	13.0	(1)	36.6
Smoked fish (pounds).....	39,814,989	21,108,088	2,900,417	957,741	1.8	1.0	88.6	202.8
Salted fish (pounds).....	128,539,299	117,780,031	7,174,581	4,981,220	4.8	6.0	9.1	44.0
All other products, including pickles, preserves, and sauces.....			45,105,129	35,725,257	28.7	36.0	.....	26.3

1 Figures for 1899 not available.

The largest percentages of increase between 1899 and 1909, 368.7 in quantity and 317.1 in value, were in dried fruits, and the next largest in smoked fish, 88.6 per cent in quantity and 202.8 per cent in value. The greatest absolute increase in value (\$22,834,316) was in canned vegetables. Of the six classes of products for which statistics are shown, canned fruits showed the lowest rate of increase in value (14.4 per cent).

In 1909 the value of canned vegetables represented 32.8 per cent—nearly one-third—of the total value of products; that of canned and dried fruits together, 20.8 per cent; that of canned, smoked, and salted fish and canned oysters and clams, 17.6 per cent; and that of pickles, preserves, sauces, and all other products, 28.7 per cent.

Considerable changes occurred between 1899 and 1909 in the relative importance of the several classes of products, as the result of marked differences in the rates of increase.

Table 17 shows the quantity and value of each specific product of the canning and preserving industry as returned at the censuses of 1909, 1904, and 1899.

QUANTITY AND VALUE OF SPECIFIC PRODUCTS FOR THE UNITED STATES AS A WHOLE: 1909, 1904, AND 1899.

PRODUCT.	1909	1904	1899
Total value	\$157,101,201	\$130,485,976	\$88,385,464
FRUITS AND VEGETABLES.			
Value.....	\$84,347,783	\$72,998,758	\$44,802,665
<i>Canned vegetables:</i>			
Cases.....	32,752,469	29,579,616	19,323,730
Value.....	\$51,568,914	\$45,610,993	\$28,734,598
Tomatoes—			
Cases.....	12,909,986	9,411,084	8,700,538
Value.....	\$18,747,941	\$14,020,846	\$13,666,560
Corn—			
Cases.....	7,451,265	11,209,597	6,336,984
Value.....	\$10,332,136	\$15,952,386	\$8,191,383
Peas—			
Cases.....	5,901,703	4,694,492	2,543,722
Value.....	\$10,247,363	\$7,928,791	\$4,465,673
Beans—			
Cases.....	3,362,864	2,588,015	1,493,617
Value.....	\$6,013,098	\$4,133,810	\$2,025,123
Asparagus—			
Cases.....	228,559	(³)	(³)
Value.....	\$1,975,775	(³)	(³)
Pumpkin—			
Cases.....	440,303	246,557	138,078
Value.....	\$576,043	\$346,497	\$202,404
Sweet potatoes—			
Cases.....	347,286	192,997	83,526
Value.....	\$531,651	\$284,385	\$124,245
All other—			
Cases.....	2,080,503	1,236,874	27,365
Value.....	\$3,144,907	\$2,944,278	\$59,210
<i>Canned fruits:</i>			
Cases.....	5,501,404	4,628,241	4,467,817
Value.....	\$12,938,474	\$11,722,979	\$11,311,062
Peaches—			
Cases.....	1,467,213	1,304,867	1,449,356
Value.....	\$3,753,698	\$3,902,441	\$4,283,165
Apples—			
Cases.....	1,205,742	490,341	645,762
Value.....	\$1,898,720	\$738,013	\$1,125,119
Pears—			
Cases.....	837,782	789,120	672,485
Value.....	\$1,833,214	\$2,192,910	\$2,188,201
Apricots—			
Cases.....	630,185	539,815	531,648
Value.....	\$1,825,311	\$1,641,919	\$1,683,252
Berries—			
Cases.....	815,851	489,637	600,419
Value.....	\$1,754,927	\$1,058,659	\$1,092,976
Cherries—			
Cases.....	390,351	319,350	114,367
Value.....	\$1,019,013	\$825,522	\$307,788
All other—			
Cases.....	354,280	695,111	453,780
Value.....	\$853,591	\$1,363,515	\$730,562

QUANTITY AND VALUE OF SPECIFIC PRODUCTS FOR THE UNITED STATES AS A WHOLE: 1909, 1904, AND 1899—Continued.

PRODUCT.	1909	1904	1899
FRUITS AND VEGETABLES—contd.			
<i>Dried fruits:</i>			
Pounds.....	400,328,767	343,579,623	85,439,406
Value.....	\$19,840,395	\$16,664,784	\$4,757,005
Prunes—			
Pounds.....	138,498,490	117,808,181	25,413,763
Value.....	\$5,130,412	\$3,296,628	\$970,927
Raisins—			
Pounds.....	111,774,767	121,409,881	14,984,221
Value.....	\$4,837,933	\$6,349,381	\$1,062,268
Apples—			
Pounds.....	44,568,244	40,737,089	33,212,309
Value.....	\$3,098,095	\$1,738,610	\$1,906,642
Peaches—			
Pounds.....	46,843,391	25,861,074	6,662,390
Value.....	\$2,423,083	\$1,702,205	\$312,485
Apricots—			
Pounds.....	29,205,569	19,559,573	6,465,217
Value.....	\$2,277,177	\$1,410,838	\$455,394
All other—			
Pounds.....	29,438,306	18,203,825	701,606
Value.....	\$2,073,695	\$1,144,122	\$49,279
FISH AND OYSTERS.			
Value.....	\$27,848,289	\$22,194,635	\$18,807,542
<i>Canned fish and oysters:</i>			
Pounds.....	235,418,713	207,077,976	.....
Value.....	\$17,573,311	\$13,531,786	\$12,868,572
Salmon—			
Pounds.....	99,831,528	48,128,926	62,652,792
Value.....	\$8,723,565	\$4,251,387	\$5,679,324
Sardines—			
Pounds.....	90,694,284	87,224,524	44,951,244
Value.....	\$4,931,831	\$4,380,498	\$4,212,351
Oysters—			
Pounds.....	28,192,392	59,249,043	(⁴)
Value.....	\$2,443,101	\$3,799,412	\$2,054,800
All other—			
Pounds.....	16,700,509	12,475,483	9,625,825
Value.....	\$1,474,814	\$1,100,489	\$922,097
<i>Smoked fish:</i>			
Pounds.....	39,814,989	36,617,904	21,108,066
Value.....	\$2,900,417	\$2,528,240	\$957,741
Salmon—			
Pounds.....	6,836,099	6,833,560	1,975,647
Value.....	\$950,540	\$831,184	\$136,331
Herring—			
Pounds.....	21,369,856	19,737,537	12,578,429
Value.....	\$931,611	\$631,352	\$330,590
Finnan haddie—			
Pounds.....	4,513,222	3,014,160	1,360,500
Value.....	\$304,620	\$174,234	\$75,360
All other—			
Pounds.....	7,095,812	7,032,647	6,195,490
Value.....	\$713,646	\$891,470	\$415,460
<i>Salted fish:</i>			
Pounds.....	128,539,299	111,728,665	117,780,031
Value.....	\$7,174,561	\$6,134,609	\$4,981,229
Cod—			
Pounds.....	54,302,338	48,757,819	64,731,210
Value.....	\$3,248,569	\$3,013,320	\$3,081,045
Mackerel—			
Pounds.....	9,045,469	8,326,566	10,458,313
Value.....	\$740,513	\$678,326	\$662,008
Herring—			
Pounds.....	21,718,467	15,824,192	13,933,426
Value.....	\$461,267	\$409,223	\$332,220
Haddock—			
Pounds.....	3,065,156	4,737,975	6,927,919
Value.....	\$148,191	\$213,394	\$197,360
All other—			
Pounds.....	40,407,869	34,082,113	21,729,163
Value.....	\$2,575,901	\$1,820,346	\$708,596
ALL OTHER PRODUCTS, INCLUDING PICKLES, PRESERVES, AND SAUCES.			
Value.....	\$45,105,129	\$35,272,585	\$35,725,257

¹ In addition, similar products to the value of \$5,423,199 were reported for 1909 by establishments in other industries, as follows:

PRODUCT.	Quantity.	Value.
Total.....		\$5,423,199
Canned vegetables.....cases..	769,017	1,714,909
Canned fruits.....cases..	27,474	76,964
Dried fruits.....pounds..	1,007,033	53,159
Canned fish.....pounds..	531,054	19,649
Smoked fish.....pounds..	924,785	38,841
Salted fish.....pounds..	4,630,322	143,540
Pickles, preserves, and sauces.....		3,376,137

² In addition, 140,263 cases of fruits and vegetables, to the value of \$288,138; 1,847,625 pounds of fish, to the value of \$274,403; and oysters to the value of \$12,900, were reported by establishments in other industries.

³ Not reported separately.

⁴ Not reported.

⁵ Including canned clams.

The data do not include quantities of vegetables and fruits preserved or dried by the growers and sold to the packing establishments or directly to the consumer, or the unsold products carried over from preceding years. The number of cases of each canned product has been computed on the basis of standard sizes of cans, 24 cans to the case. The standard size adopted for each of the respective products is indicated by the notations of Table 21. In making this conversion three cases of No. 1 cans are considered the equivalent of one and one-half cases of No. 2 cans or one case of No. 3, and a case of 12 one-gallon cans as the equivalent of two cases of No. 2, or of one and one-third cases of No. 3 cans.

Canned vegetables.—The total quantity of all canned vegetables reported by establishments in the canning and preserving industry was 19,323,730 cases in 1899 and 32,752,469 cases in 1909, an increase of 13,428,739 cases, or 69.5 per cent. Canned tomatoes were the principal class in both 1909 and 1899, and during the decade there was an increase of 4,209,448 in the number of cases, or 48.4 per cent. Canned corn, the next most important product, showed an increase during this period of 1,114,281 cases, or 17.6 per cent. Following corn, the most important canned vegetables shown for 1909, as measured by value, were peas, beans, asparagus, pumpkin, and sweet potatoes.

Canned fruits.—Of canned fruits, the output in 1899 was 4,467,817 cases, and in 1909, 5,501,404 cases. There was thus an increase of 1,033,587 cases, or 23.1 per cent; the value increased \$1,627,412, or 14.4 per cent. Canned peaches were the principal product in both 1909 and 1899, but the increase in quantity during the decade was only 1.2 per cent, and there was a decrease of \$529,467, or 12.4 per cent, in value. Apples, pears, apricots, and berries were next in importance in 1909, all except pears showing increases during the decade. Of pears, there was a decrease in quantity of 34,703 cases, or 5.2 per cent, and in value of \$354,987, or 16.2 per cent.

Dried fruits.—In dried fruits there was, as already stated, an exceptionally large increase during the decade. The output was 85,439,406 pounds in 1899 and 400,328,767 pounds in 1909. It is possible that part of this increase is attributable to the transfer to factories of part of the business which was formerly done on the farms.

Every class of dried fruits except apples increased several fold in quantity and value between 1899 and 1909. Dried prunes, which are the leading product, increased 113,084,727 pounds, or 445 per cent, in quantity and \$4,159,485, or 428.4 per cent, in value; and raisins increased 96,790,546 pounds, or 645.9 per cent, in quantity and \$3,775,665, or 355.4 per cent, in value. Dried apples, peaches, and apricots follow in order of importance in 1909, as measured by value. Of these three products, dried peaches show the

greatest relative gain in quantity during the decade, 727.3 per cent.

Canned fish and oysters.—The total quantity of canned fish and oysters is not available for 1899, but the value of these products increased during the decade 1899–1909 from \$12,868,572 to \$17,573,311, or 36.6 per cent. Canned salmon was the most important product of this group at both censuses, and shows a gain of 37,178,736 pounds, or 59.3 per cent, in quantity and \$3,044,241, or 53.6 per cent, in value. Sardines, next in importance, increased 45,743,040 pounds, or 101.8 per cent, in quantity but only \$719,480, or 17.1 per cent, in value. The quantity of oysters canned was not reported in 1899, but the value increased \$388,301, or 18.9 per cent, during the decade.

Smoked fish.—The total quantity of smoked fish reported was 21,108,066 pounds in 1899 and 39,814,989 pounds in 1909, an increase of 18,706,923 pounds, or 88.6 per cent; the value increased \$1,942,676, or 202.8 per cent. At both censuses smoked salmon and herring were the chief products of this group, both in quantity and in value, the former showing the larger relative increase in each respect.

Salted fish.—The total quantity of salted fish reported by factories in 1899 was 117,780,031 pounds, and that in 1909, 128,539,299 pounds, an increase of 10,759,268 pounds, or 9.1 per cent; the value increased \$2,193,332, or 44 per cent. Of the total value of all salt-fish products, that of cod formed 45.3 per cent in 1909 and 61.9 per cent in 1899. The quantity of cod reported decreased 10,428,872 pounds, or 16.1 per cent, but the value increased 5.4 per cent. Mackerel, herring, and haddock follow in importance in the order named, as measured by value, but the value of these three classes of products combined formed a smaller proportion of the total value of salted fish products in 1909 than in 1899, the proportions being 18.8 per cent and 23.9 per cent, respectively. On the other hand, unspecified kinds of salted fish, which possibly include some cod, mackerel, herring, and haddock not distinguished in the reports, contributed a much larger proportion of the total value in 1909 than in 1899.

It may be noted that, broadly speaking, most of the classes of canned fruits and vegetables and of dried fruits showed substantially as great a percentage of increase in quantity as in value between 1899 and 1909, and some of them a greater. While the figures may not be altogether comparable because of possible changes in the relative importance of the different grades produced, they seem to indicate that there has been in general no advance in the average unit prices of canned vegetables and fruits and dried fruits. On the other hand, each specified class of smoked and salted fish except salted herring showed a materially greater percentage of increase in value than in quantity, indicating apparently an increase in prevailing prices. In the case of canned salmon, however, some

decrease in prices appears to have taken place, and in the case of canned sardines the quantity produced increased very much faster than the value.

Table 18 shows, for 1909, the number of cases of fruits and vegetables, distributed by size of cans, as reported (except that the 2½-pound cans, which are somewhat exceptional, have been reduced to a 3-pound-can basis).

PRODUCT.	Total number of cases reduced to standard size (24 cans to the case): 1909	NUMBER OF CASES OF—			
		No. 1 cans.	No. 2 cans.	No. 3 cans.	Gallon cans (12 cans to case).
Canned vegetables.....	32,752,469	1,358,293	17,617,935	13,571,858	1,049,493
Asparagus.....	1,223,559	141,538	143,723	76,406	6,867
Beans:					
Baked.....	2,175,160	526,565	601,352	578,851	9,376
String.....	1,025,324	28,367	832,635	62,387	42,464
Lima.....	249,533	5,355	218,213	4,852	10,682
All other.....	366,347	13,002	347,894	4,896	2,305
Beets.....	126,422	.....	27,429	100,020	6,087
Corn.....	7,451,265	128,539	7,323,502	9,269	24,795
Peas.....	5,901,703	321,042	5,604,503	23,982	50,353
Pumpkin.....	440,303	1,155	42,695	321,974	66,692
Sweet potatoes.....	347,286	.....	39,339	314,763	4,273
Spinach.....	149,255	1,271	8,730	107,973	26,279
Squash.....	114,196	25	11,142	62,803	32,960
Succotash.....	169,577	2,570	249,019	.....	2,031
Tomatoes.....	12,909,986	121,688	2,011,962	10,580,368	710,734
Okra and tomatoes.....	159,101	137	20,828	32,353	9,613
All other vegetables.....	1,461,952	67,039	134,969	1,290,961	43,982
Canned fruits.....	5,501,404	182,007	2,264,737	1,482,344	1,482,351
Apples.....	1,205,742	.....	15,254	167,182	771,293
Apricots.....	630,185	23,983	362,194	244,659	102,053
Blackberries.....	210,538	1,050	86,568	17,682	48,461
Blueberries.....	73,531	895	24,445	1	27,675
Cherries.....	390,351	9,888	202,224	64,781	43,007
Currants.....	1,909	150	.....	.....	644
Figs.....	5,079	7,015	2,211	345	691
Gooseberries.....	76,312	.....	58,511	365	8,827
Peaches.....	1,467,213	47,321	619,755	650,212	291,341
Pears.....	1,637,782	30,062	418,669	263,407	63,910
Pineapples.....	78,557	32,981	62,656	9,928	11,899
Plums.....	220,057	602	87,965	38,738	35,699
Quinces.....	13,483	75	240	154	2,358
Raspberries.....	247,084	6,932	158,156	3,818	39,857
Strawberries.....	208,406	18,262	156,680	4,352	18,533
All other vegetables.....	146,195	2,791	10,209	16,720	16,303

1 Standard case contains 24 No. 3 cans.
2 Standard case contains 24 No. 2 cans.

Table 19 is a detailed statement for canned fruits and vegetables, in the United States as a whole, for 1909, distinguishing the 2½-pound cans, and giving the actual total number of cases by kinds as reported.

PRODUCT.	NUMBER OF CASES PRODUCED IN 1909.					
	Total.	No. 1 cans.	No. 2 cans.	No. 2½ cans.	No. 3 cans.	Gallon cans.
Canned vegetables.....	33,709,148	1,368,293	17,617,935	669,412	13,014,015	1,049,493
Asparagus.....	378,956	141,538	143,723	62,534	24,294	6,867
Beans.....	3,290,151	573,289	2,000,094	5,729	646,212	64,827
Beets.....	133,567	.....	27,429	189	99,866	6,087
Corn.....	7,436,105	128,539	7,323,502	.....	9,269	24,795
Peas.....	5,999,890	321,042	5,604,503	.....	23,982	50,353
Pumpkin.....	438,328	1,155	42,695	4,873	317,913	66,692
Spinach.....	144,253	1,271	8,730	.....	107,973	26,279
Squash.....	106,930	25	11,142	.....	62,803	32,960
Succotash.....	253,620	2,570	249,019	.....	.....	2,031
Sweet potatoes.....	358,375	.....	39,339	.....	314,763	4,273
Tomatoes.....	13,511,939	121,688	2,011,962	523,120	10,144,435	710,734
All other vegetables.....	1,612,044	67,176	155,797	72,971	1,262,505	53,595
Canned fruits.....	5,586,542	182,007	2,264,737	1,050,616	608,831	1,482,351
Apples.....	953,876	.....	15,254	882	166,447	771,293
Apricots.....	777,309	23,983	362,194	266,521	22,558	102,053
Berries.....	682,430	27,139	483,360	15,358	13,420	143,153
Cherries.....	331,282	9,888	202,224	68,294	7,869	43,007
Currants.....	794	150	.....	.....	.....	644
Figs.....	10,262	7,015	2,211	.....	345	691
Peaches.....	1,690,174	47,321	619,755	489,267	242,490	291,341
Pears.....	804,232	30,062	418,669	169,106	122,485	63,910
Pineapples.....	117,464	32,981	62,656	.....	9,928	11,899
Plums.....	168,364	602	87,965	32,159	11,939	35,699
Quinces.....	2,827	75	240	.....	154	2,358
All other fruits.....	47,528	2,791	10,209	9,029	9,196	16,303

California in 1909 packed in 2½-pound cans 58,625 cases of asparagus, 4,465 cases of beans, 1,908 cases of pumpkin, 142,526 cases of tomatoes, and 9,654 cases of all other vegetables; and 587 cases of apples, 265,677 cases of apricots, 10,084 cases of berries, 54,438 cases of cherries, 485,917 cases of peaches, 160,295 cases of pears, 29,927 cases of plums, and 9,026 cases of all other fruits. This size of can was also reported to some extent in Colorado, Oregon, Utah, and Washington.

Value of products, by states.—Table 20 shows the value of the principal products for the principal states producing each, as reported for the censuses of 1909, 1904, and 1899. The data relate only to the products of establishments in the canning and preserving industry proper.

Canned vegetables.—In the production of canned tomatoes, the most important of the canned vegetables, Maryland led all states at all three censuses, reporting 40.9 per cent of the total value in 1909 and 26.8 per cent in 1899. Six states—Maryland, Delaware, New Jersey, Indiana, Virginia, and California—each reported canned tomatoes in 1909 in excess of \$1,000,000 in value, their combined output representing 78.1 per cent of the total value of this product in the country. In the production of canned corn six states—Illinois, Maine, Iowa, New York, Ohio, and Maryland—were especially prominent, together reporting 78.6 per cent of the value of all canned corn in 1909. Illinois, which held first rank in 1909, reported 21 per cent of the total value of this product for the United States in that year and 14.5 per cent in 1899. In 1899 New York was the leading state in the value of canned corn. Of the total value of canned peas in 1909, 59.4 per cent was reported by two states, Wisconsin and New York; Wisconsin led in that year and New York in 1899. The production of canned beans, which includes canned baked beans, is largely in three states, Indiana, New York, and Maryland, these three states reporting 65.2 per cent of the total value of canned beans in 1909 and 58.7 per cent in 1899. Indiana led in 1909 and Maryland in 1899. Canned asparagus was first shown separately in 1909, when the value was reported as \$1,975,775, of which 90.8 per cent was contributed by California.

Canned fruits.—Of the canned peaches, the most important of the canned fruits, California contributed 80.3 per cent of the total value in 1909 and 72.5 per cent in 1899. New York reported 39.7 per cent of the total value of canned apples in 1909 and 49.8 per cent in 1899. Canned pears were mostly reported from California, which contributed 71.8 per cent of the total value in 1909 and 73.6 per cent in 1899. The canning of apricots in 1909 was confined almost entirely to California. California and New York combined produced 80 per cent in value of the canned cherries in 1909 and 74 per cent in 1904.

Dried fruits.—Of the total value of dried fruits, California reported 81.3 per cent in 1909. This state

reported all of the raisins and dried apricots, practically all of the dried peaches, and 85.7 per cent of the dried prunes; but in dried apples it was second, reporting only 15.5 per cent of the value of this product, as compared with 75.3 per cent for New York.

Canned fish and oysters.—Of the canned salmon, the state of Washington reported 84.3 per cent, as measured by value, in 1909 and 66 per cent in 1899. Most of the canned sardines were reported from Maine at both censuses. Four states, Maryland, Louisiana, California, and Mississippi, together reported 77.7 per cent of the total value of canned oysters in 1909, Maryland being the most important with 35.6 per cent.

Smoked fish.—Of the total value of smoked salmon, the most important smoked fish, New York and Washington in 1909 reported 51.2 per cent and 41 per cent, respectively. Of smoked herring, Massachusetts reported 49.1 per cent, as measured by value, in 1909, and Maine 27.4 per cent. In 1899 the proportions were different, Maine reporting 41.2 per cent and Massachusetts 32 per cent.

Salted fish.—Massachusetts reported 78.3 per cent of the total value of salted cod in 1909 and 82.6 per cent in 1899. Massachusetts also leads in the value of salt mackerel, with 98.6 per cent of the total value in 1909.

VALUE OF SPECIFIC PRODUCTS, BY STATES: 1909, 1904, AND 1899.

Table 20 PRODUCT AND STATE.	VALUE.			PRODUCT AND STATE.	VALUE.		
	1909	1904	1899		1909	1904	1899
CANNED VEGETABLES.				CANNED FRUITS—continued.			
Beans	\$8,013,098	\$4,133,510	\$2,025,123	Berries	\$1,754,927	\$1,058,559	\$1,092,976
Illinois.....	562,249	321,458	251,483	California.....	171,995	168,640	218,733
Indiana.....	2,116,648	491,233	270,670	Maine.....	105,434	.....	.....
Maine.....	151,476	92,231	33,635	Maryland.....	375,319	(1)	(1)
Maryland.....	778,732	1,031,025	470,314	Michigan.....	150,082	(1)	(1)
New Jersey.....	244,759	272,755	64,768	New York.....	596,130	372,171	321,759
New York.....	1,024,065	1,055,253	448,314	DRIED FRUITS.			
Ohio.....	264,005	241,125	199,615	Apples	3,098,095	1,768,610	1,908,642
Wisconsin.....	101,763	55,968	23,000	Arkansas.....	112,091	129,094	80,861
Corn	10,332,136	15,952,386	8,191,383	California.....	481,173	40,659	155,893
Illinois.....	2,170,082	2,403,720	1,189,700	Michigan.....	141,656	177,343	243,285
Indiana.....	679,446	958,455	270,265	New York.....	2,333,137	1,331,895	1,275,109
Iowa.....	1,241,460	2,616,178	1,146,075	Apricots	2,277,177	1,410,838	455,394
Maine.....	1,320,223	1,525,089	1,038,316	California.....	2,277,177	1,410,838	442,544
Maryland.....	1,039,905	2,021,627	1,070,096	Peaches	2,423,083	1,702,205	312,495
New York.....	1,197,999	2,272,682	1,925,496	California.....	2,422,043	1,701,105	301,495
Ohio.....	1,156,509	1,736,503	642,161	Prunes	5,180,412	3,299,628	970,927
Peas	10,247,363	7,928,791	4,465,673	California.....	4,394,922	3,169,878	907,041
Indiana.....	753,527	644,439	310,172	Oregon.....	470,911	26,000	17,351
Maryland.....	619,981	1,019,131	957,436	Washington.....	258,909	.....	14,645
Michigan.....	796,840	471,613	92,000	Raisins	4,837,833	6,349,381	1,062,268
New York.....	2,661,366	2,598,291	1,473,912	California.....	4,837,933	6,349,381	1,062,268
Wisconsin.....	3,410,628	2,011,226	807,408	CANNED FISH AND OYSTERS.			
Tomatoes	18,747,941	14,020,848	13,668,680	Salmon	8,723,666	4,251,387	5,679,324
California.....	1,120,632	845,805	2,068,997	Oregon.....	1,341,481	1,694,762	1,655,329
Delaware.....	1,605,069	1,037,595	1,121,546	Washington.....	7,354,569	2,431,605	3,745,957
Indiana.....	1,469,219	1,820,876	1,286,027	Sardines	4,931,831	4,380,498	4,212,351
Maryland.....	7,674,960	4,976,098	3,659,137	California.....	238,607	78,000	78,860
New Jersey.....	1,502,398	1,273,426	1,668,855	Maine.....	4,609,224	4,291,324	4,049,784
New York.....	657,375	389,036	483,112	Oysters	2,443,101	3,799,412	2,054,500
Ohio.....	707,682	535,751	814,044	California.....	334,539	222,617	.....
Utah.....	603,898	566,578	263,363	Georgia.....	105,740	256,750	.....
Virginia.....	1,269,209	747,838	474,305	Louisiana.....	383,436	507,373	71,625
CANNED FRUITS.				Maryland.....	761,198	648,646	823,567
Apples	1,898,720	738,013	1,125,119	Mississippi.....	311,161	1,340,942	639,603
California.....	136,855	67,591	71,427	South Carolina.....	268,438	529,511	.....
Maine.....	122,791	6,794	30,479	Washington.....	132,860	.....	16,535
Maryland.....	168,458	70,980	137,884	SMOKED FISH.			
Michigan.....	275,437	103,419	66,260	Herring	931,611	631,362	330,590
New York.....	753,231	354,817	500,048	Maine.....	255,498	206,879	136,310
Pennsylvania.....	100,759	23,463	22,371	Massachusetts.....	457,485	155,814	105,729
Apricots	1,825,311	1,641,818	1,583,252	Salmon	950,540	831,184	138,331
California.....	1,819,558	1,619,757	1,582,927	New York.....	486,910	319,620	13,900
Cherries	1,019,013	825,522	307,788	Washington.....	389,620	405,026	93,772
California.....	491,576	457,169	155,813	SALTED FISH.			
New York.....	323,803	133,814	71,681	Cod	3,248,669	3,013,320	3,081,045
Peaches	3,753,898	3,902,441	4,283,165	Maine.....	333,621	141,345	80,454
California.....	3,013,203	2,640,524	3,103,775	Massachusetts.....	2,542,873	2,511,159	2,544,552
Georgia.....	166,282	.....	83,475	Washington.....	201,118	49,366	45,445
Maryland.....	158,839	753,003	758,919	Mackerel	740,513	878,328	862,008
Michigan.....	175,386	179,838	102,540	Massachusetts.....	729,828	668,326	644,523
New York.....	141,142	39,399	72,591				
Pears	1,833,214	2,182,910	2,188,201				
California.....	1,316,022	1,577,823	1,610,900				
Maryland.....	111,949	199,802	151,012				
New York.....	216,858	172,944	226,082				

¹ Comparable figures can not be given.

Detailed statistics of products, by states.—Table 21 | preserving of vegetables, fruits, fish, and oysters, by gives more detailed statistics for the canning and states, for 1909.

QUANTITY AND VALUE OF SPECIFIC PRODUCTS, IN DETAIL, BY STATES: 1909.

Table 21	PRODUCT AND STATE.	Quantity.	Value.	PRODUCT AND STATE.	Quantity.	Value.
	CANNED VEGETABLES.			CANNED VEGETABLES—continued.		
		Cases. ¹			Cases. ¹	
	Asparagus	228,559	\$1,976,775	Peas—Continued.		
	California.....	1,794,346	1,794,346	Michigan.....	412,734	\$796,840
	Illinois.....	1,630	15,200	Minnesota.....	25,367	33,570
	Maryland.....	2,475	4,759	New Jersey.....	119,949	222,491
	New Jersey.....	4,421	21,190	New York.....	1,438,059	2,681,366
	New York.....	17,565	108,308	Ohio.....	205,089	359,856
	All other states.....	4,876	31,972	Pennsylvania.....	48,202	73,009
				Utah.....	61,156	100,712
	Baked beans	1,751,660	3,417,586	Virginia.....	15,466	28,310
	Colorado.....	23,309	47,402	Wisconsin.....	1,990,558	3,410,628
	Connecticut.....	16,840	16,840	All other states.....	30,259	52,213
	Illinois.....	293,548	340,342			
	Indiana.....	700,404	1,055,234	Pumpkin	440,303	578,043
	Maine.....	61,029	104,351	California.....	10,941	15,165
	Maryland.....	446,272	577,039	Colorado.....	8,814	15,893
	New Jersey.....	4,512	6,775	Delaware.....	3,247	4,546
	New York.....	23,351	39,594	Illinois.....	73,773	81,723
	Ohio.....	80,747	158,435	Indiana.....	119,965	139,738
	Pennsylvania.....	12,400	12,720	Iowa.....	7,087	11,264
	All other states.....	89,248	159,536	Kentucky.....	9,550	9,740
				Michigan.....	10,151	15,581
	String beans	1,025,324	1,666,092	Minnesota.....	6,043	8,570
	California.....	36,135	64,726	Missouri.....	5,044	6,163
	Colorado.....	40,031	64,196	New Jersey.....	12,835	14,277
	Indiana.....	31,948	30,904	New York.....	103,127	150,974
	Maine.....	18,812	27,479	Ohio.....	40,624	53,239
	Maryland.....	142,877	171,097	Pennsylvania.....	5,075	6,850
	Michigan.....	51,787	88,638	All other states.....	24,027	42,320
	Minnesota.....	8,700	13,530			
	New York.....	452,634	839,135	Sweet potatoes	347,236	531,651
	North Carolina.....	9,567	9,963	Alabama.....	5,702	12,433
	Ohio.....	32,941	52,038	Delaware.....	20,633	28,675
	Oregon.....	12,383	25,405	Georgia.....	21,167	31,730
	Pennsylvania.....	61,298	89,084	Louisiana.....	11,667	16,913
	Utah.....	10,500	15,671	Maryland.....	136,768	206,919
	Virginia.....	6,660	6,858	New Jersey.....	22,833	34,044
	Washington.....	5,204	8,891	Tennessee.....	8,147	12,150
	Wisconsin.....	54,576	101,763	Virginia.....	95,067	143,636
	All other states.....	43,271	56,544	All other states.....	25,302	45,151
	Lima beans	248,533	428,967	Spinach	149,256	294,414
	Illinois.....	8,032	8,047	Maryland.....	110,882	188,852
	Indiana.....	19,795	27,364	New Jersey.....	6,488	17,740
	Maine.....	7,299	11,252	New York.....	13,614	31,882
	Maryland.....	8,808	13,768	Ohio.....	4,504	11,598
	Michigan.....	20,980	42,028	All other states.....	13,767	44,342
	New Jersey.....	136,064	237,731			
	New York.....	21,406	37,731	Squash	114,196	194,875
	Ohio.....	12,306	24,025	California.....	5,178	8,573
	Virginia.....	7,698	14,095	Maine.....	15,227	25,845
	All other states.....	7,145	12,926	Maryland.....	2,303	3,645
				New Jersey.....	22,787	42,824
	All other beans	386,347	500,471	New York.....	28,256	49,455
	Illinois.....	167,582	209,535	Virginia.....	10,375	13,000
	Indiana.....	70,361	103,140	All other states.....	30,070	51,533
	Maine.....	5,462	8,394			
	Maryland.....	13,329	16,828	Succotash	169,577	320,141
	Michigan.....	10,241	13,748	Maine.....	15,165	37,606
	New York.....	71,785	107,305	Maryland.....	7,559	16,155
	Ohio.....	18,896	29,507	Michigan.....	16,096	43,082
	All other states.....	8,691	12,008	New York.....	68,673	174,119
				All other states.....	62,084	49,179
	Beets	128,422	261,398			
	New Jersey.....	10,642	10,937	Tomatoes	12,909,936	18,747,941
	New York.....	52,944	114,381	Arkansas.....	27,080	45,872
	Ohio.....	9,337	27,841	California.....	536,827	1,120,632
	Wisconsin.....	21,083	40,978	Colorado.....	142,008	275,073
	All other states.....	32,416	67,261	Connecticut.....	24,700	51,752
				Delaware.....	1,262,635	1,605,069
	Corn	7,451,265	10,332,136	Illinois.....	100,491	149,341
	Delaware.....	94,697	138,739	Indiana.....	916,755	1,469,210
	Illinois.....	1,619,897	2,170,082	Iowa.....	111,692	176,340
	Indiana.....	520,401	679,446	Kentucky.....	139,678	213,121
	Iowa.....	987,038	1,241,460	Maryland.....	5,757,811	7,674,960
	Maine.....	792,185	1,320,223	Michigan.....	99,075	158,519
	Maryland.....	772,828	1,039,905	Missouri.....	260,246	392,909
	Michigan.....	47,680	74,791	New Jersey.....	977,010	1,502,398
	Minnesota.....	193,807	251,877	New York.....	347,714	657,375
	Missouri.....	18,111	24,608	North Carolina.....	7,574	11,700
	Nebraska.....	169,910	232,476	Ohio.....	444,034	707,682
	New York.....	771,475	1,197,999	Pennsylvania.....	120,919	178,768
	Ohio.....	893,054	1,156,509	Tennessee.....	92,173	140,446
	Pennsylvania.....	44,722	66,234	Texas.....	9,645	19,850
	Vermont.....	163,446	271,358	Utah.....	332,372	603,898
	Virginia.....	5,204	6,788	Virginia.....	998,354	1,269,209
	Wisconsin.....	306,999	383,894	West Virginia.....	148,319	205,822
	All other states.....	49,811	75,747	Wisconsin.....	9,761	14,818
				All other states.....	42,203	103,168
	Peas	5,901,703	10,247,363			
	California.....	123,349	250,624	Okra and tomatoes	59,101	89,537
	Colorado.....	150,505	361,936	California.....	1,050	2,100
	Delaware.....	190,261	249,357	Maryland.....	36,629	53,572
	Illinois.....	171,212	227,068	South Carolina.....	631	1,262
	Indiana.....	621,764	753,527	Virginia.....	711	1,044
	Iowa.....	15,879	25,875	All other states.....	20,080	31,559
	Maryland.....	381,894	619,981			

¹ 24 cans standard size to the case.

² Standard case contains 24 No. 3 cans.

³ Standard case contains 24 No. 2 cans.

MANUFACTURES.

QUANTITY AND VALUE OF SPECIFIC PRODUCTS, IN DETAIL, BY STATES: 1909—Continued.

Table 21—Continued.
PRODUCT AND STATE.

PRODUCT AND STATE.	Quantity.	Value.	PRODUCT AND STATE.	Quantity.	Value.
CANNED VEGETABLES—continued.			CANNED FRUIT—continued.		
All other vegetables	¹ 1,461,952	\$1,984,542	Plums	¹ 220,057	\$346,953
California.....	52,014	173,103	California.....	138,996	230,384
Colorado.....	52,136	88,015	Michigan.....	11,420	13,717
Illinois.....	129,284	172,564	New York.....	52,853	76,449
Indiana.....	834,848	974,134	Oregon.....	9,841	17,642
Iowa.....	8,134	13,793	Washington.....	4,100	4,414
Kentucky.....	7,455	8,121	All other states.....	2,847	4,347
Louisiana.....	8,836	18,763	Raspberries	² 247,084	641,899
Maryland.....	94,287	156,868	California.....	8,891	11,976
Michigan.....	14,538	23,396	Illinois.....	2,555	5,260
New Jersey.....	5,322	17,857	Maryland.....	14,052	25,619
New York.....	45,388	81,980	Michigan.....	27,384	81,112
Ohio.....	14,964	11,156	New York.....	169,486	445,421
Tennessee.....	14,800	16,400	Ohio.....	3,924	11,358
Wisconsin.....	153,611	182,150	Oregon.....	9,658	23,206
All other states.....	26,335	46,242	Washington.....	10,109	23,554
			All other states.....	0,005	14,393
CANNED FRUIT.			Strawberries	² 208,408	528,347
Apples	¹ 1,205,742	1,898,720	California.....	13,137	41,990
Arkansas.....	48,062	76,626	Maryland.....	106,724	228,860
California.....	67,710	136,855	Michigan.....	9,754	29,777
Colorado.....	35,992	58,699	New Jersey.....	30,478	71,990
Maine.....	75,540	122,791	New York.....	32,159	113,446
Maryland.....	111,347	168,458	Oregon.....	3,490	10,361
Michigan.....	163,079	275,437	Pennsylvania.....	4,983	10,241
Missouri.....	28,224	37,680	All other states.....	7,681	21,682
Nebraska.....	6,636	10,699	All other fruits	² 50,587	143,021
New York.....	429,180	753,231	California.....	19,382	66,879
North Carolina.....	5,609	7,523	Maryland.....	6,817	9,422
Ohio.....	8,674	16,726	New York.....	17,093	50,725
Oregon.....	8,557	15,918	All other states.....	7,295	15,995
Pennsylvania.....	149,398	100,759	DRIED FRUITS.		
Virginia.....	11,870	16,613	Apples	¹ 44,563,244	3,098,095
Washington.....	22,533	42,319	Arkansas.....	1,571,945	112,091
All other states.....	33,331	58,386	California.....	6,860,170	481,173
Apricots	² 630,185	1,825,311	Illinois.....	202,100	11,357
California.....	627,701	1,819,558	Michigan.....	1,982,611	141,656
All other states.....	2,484	5,753	New York.....	33,652,115	2,333,137
Blackberries	² 210,538	339,005	Pennsylvania.....	293,750	18,145
California.....	78,024	117,849	All other states.....	5,553	536
Maryland.....	29,883	39,316	Apricots	29,205,569	2,277,177
Michigan.....	6,312	16,693	California.....	29,205,569	2,277,177
New Jersey.....	18,629	27,842	Peaches	46,843,391	2,423,083
New York.....	8,424	26,657	California.....	46,827,391	2,422,043
North Carolina.....	14,464	17,745	All other states.....	16,000	1,040
Virginia.....	6,524	7,296	Prunes	138,498,490	6,130,412
Washington.....	24,052	40,502	California.....	118,917,876	4,394,922
All other states.....	24,226	45,105	Oregon.....	14,009,597	470,911
Blueberries	³ 73,531	122,001	Washington.....	5,445,017	258,909
Maine.....	66,592	105,434	All other states.....	126,000	5,670
Maryland.....	1,916	3,537	Raisins	111,774,767	4,837,933
All other states.....	5,023	13,030	California.....	111,774,767	4,837,933
Cherries	³ 390,351	1,019,013	Raspberries	130,505	22,018
California.....	224,084	491,575	California.....	37,847	3,000
Colorado.....	8,470	34,740	New York.....	70,458	13,338
Maryland.....	10,092	18,204	All other states.....	22,200	5,680
Michigan.....	20,572	72,710	All other dried fruit	29,307,801	2,051,677
New York.....	90,445	323,803	California.....	26,102,930	1,721,468
Oregon.....	22,770	49,203	Illinois.....	3,193,680	319,368
All other states.....	13,918	28,778	All other states.....	11,191	10,841
Figs	² 5,079	49,970	CANNED FISH AND OYSTERS.		
Louisiana.....	2,124	23,733	Salmon	99,831,528	8,723,565
Mississippi.....	1,979	22,940	Oregon.....	12,969,670	1,341,481
All other states.....	976	3,297	Washington.....	86,588,258	7,354,569
Gooseberries	³ 76,312	123,675	All other states.....	273,600	27,515
Maryland.....	53,513	77,987	Sardines	80,694,284	4,931,831
Michigan.....	11,766	21,163	California.....	1,980,364	238,607
New York.....	3,866	9,680	Maine.....	87,513,920	4,609,224
Oregon.....	1,938	3,385	All other states.....	1,200,000	84,000
All other states.....	5,229	11,460	Oysters	28,192,392	2,443,101
Peaches	¹ 1,467,213	3,753,698	California.....	1,751,430	334,639
Arkansas.....	7,980	13,918	Florida.....	1,120,635	65,497
California.....	1,149,590	3,013,203	Georgia.....	1,737,863	105,740
Georgia.....	71,931	156,282	Louisiana.....	6,478,904	383,436
Maryland.....	80,489	158,839	Maryland.....	3,726,033	761,198
Michigan.....	74,535	175,386	Mississippi.....	5,644,283	311,161
New York.....	41,727	141,142	South Carolina.....	5,250,148	268,438
North Carolina.....	7,370	11,053	Washington.....	1,250,632	132,880
Ohio.....	5,199	15,036	All other states.....	1,232,464	80,212
Tennessee.....	7,235	21,490	All other canned fish	16,700,509	1,474,814
All other states.....	21,097	47,349	California.....	261,580	25,547
Pears	² 637,782	1,833,214	Florida.....	283,376	17,800
California.....	433,796	1,316,022	Louisiana.....	3,203,531	253,184
Maryland.....	67,427	111,949	Maine.....	2,931,832	203,515
Michigan.....	8,066	17,193	Maryland.....	551,780	80,815
New Jersey.....	43,750	82,082	Massachusetts.....	327,630	28,882
New York.....	51,686	216,858	Mississippi.....	5,008,951	433,693
Oregon.....	14,598	42,842	New York.....	121,256	75,777
Washington.....	11,549	26,058	Oregon.....	81,000	10,800
All other states.....	6,910	20,210	Virginia.....	947,102	116,896
Pineapples	² 78,557	313,647	Washington.....	2,553,531	206,921
Maryland.....	67,604	252,384	All other states.....	428,940	20,984
New York.....	3,752	24,117			
All other states.....	7,111	37,146			

¹ 24 cans standard size to the case.

² Standard case contains 24 No. 3 cans.

³ Standard case contains 24 No. 2 cans.

⁴ Including canned clams.

QUANTITY AND VALUE OF SPECIFIC PRODUCTS, IN DETAIL, BY STATES: 1909—Continued.

Table 21—Continued.					
PRODUCT AND STATE.	Quantity.	Value.	PRODUCT AND STATE.	Quantity.	Value.
SMOKED FISH.			SALTED FISH.		
	<i>Pounds.</i>			<i>Pounds.</i>	
Finnan haddock	4,513,222	\$304,820	Cod	54,302,338	\$3,248,869
Maine.....	975,682	63,141	Maine.....	7,267,330	333,621
Massachusetts.....	2,367,540	150,039	Massachusetts.....	37,316,679	2,542,873
All other states.....	1,170,000	91,440	Washington.....	4,910,329	201,118
			All other states.....	4,808,000	171,057
Herring	21,369,856	931,811	Haddock	3,065,158	148,131
Maine.....	7,592,933	256,498	Maine.....	992,935	30,324
Massachusetts.....	9,972,346	457,485	Massachusetts.....	2,072,221	117,867
New York.....	335,800	29,026			
Pennsylvania.....	1,398,607	74,769	Herring	21,718,467	481,237
All other states.....	2,070,110	114,833	Maryland.....	8,248,995	136,653
			Massachusetts.....	4,071,330	111,950
Salmon	8,836,099	950,540	New York.....	693,786	94,681
New Jersey.....	146,885	28,020	Virginia.....	4,340,000	43,325
New York.....	2,595,614	486,010	All other states.....	4,364,356	74,678
Washington.....	3,827,000	389,020			
All other states.....	266,600	45,990	Mackerel	9,045,489	740,513
			Massachusetts.....	8,753,969	729,828
All other smoked fish	7,095,812	713,648	All other states.....	291,500	10,685
Illinois.....	464,600	46,460			
Massachusetts.....	2,223,125	222,158	All other salted fish	40,407,869	2,575,901
New Jersey.....	282,450	58,900	California.....	3,404,659	342,250
New York.....	1,121,678	255,707	Louisiana.....	324,950	53,147
Pennsylvania.....	2,022,500	65,210	Maine.....	8,549,502	230,845
Washington.....	211,600	20,692	Massachusetts.....	15,154,940	612,614
Wisconsin.....	216,975	19,324	New York.....	1,861,751	228,139
All other states.....	552,884	25,195	Oregon.....	5,333,674	731,600
			Pennsylvania.....	193,390	19,773
			Washington.....	4,756,970	314,720
			Wisconsin.....	152,917	10,896
			All other states.....	675,116	31,917

GENERAL STATISTICS, BY STATES.

The principal data concerning the canning and preserving industry, other than the quantity and value of specific products, are presented in Tables 22 and 23, Table 22 showing, by states, for 1909, 1904, and 1899, the number of establishments, number of persons en-

gaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture, while Table 23 gives more detailed figures for the industry, by states, in 1909.

CANNING AND PRESERVING, ALL BRANCHES COMBINED—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States	1909	3,787	71,972	4,244	7,760	69,968	81,179	\$113,207	\$7,864	\$19,082	\$101,823	\$157,101	\$55,278
	1904	3,168	86,022	3,450	5,628	66,944	60,831	79,246	5,231	16,336	83,147	130,466	47,319
	1899	2,570			4,199	67,012	38,624	55,481	3,479	13,705	83,868	89,335	35,887
Alabama	1909	10	67	19	2	46	51	22	(1)	5	16	25	9
	1904	5	27	13	1	13	20	7	(1)	2	4	8	4
	1899	3	20	3	1	16		8	(1)	2	3	8	5
Arkansas	1909	44	379	65	22	292	428	255	9	54	181	279	98
	1904	67	302	100	8	194	202	124	2	38	104	180	76
	1899	34	182	44	2	136		33	(1)	22	51	101	50
California	1909	196	8,714	148	809	7,757	7,453	18,316	1,080	3,454	24,009	32,915	8,906
	1904	236	8,510	160	611	7,739	4,635	11,187	797	2,800	18,655	26,083	7,428
	1899	183			349	8,200		5,511	344	2,257	10,145	14,941	4,796
Colorado	1909	30	630	15	97	518	1,349	1,486	107	250	672	1,528	856
	1904	15	358	14	29	315	641	554	39	136	429	821	392
	1899	12			27	237		312	29	76	250	406	156
Connecticut	1909	12	166	8	30	128	199	329	26	45	175	346	171
	1904	12	161	12	20	129	254	182	12	42	86	180	94
	1899	9			15	133		130	7	37	103	180	77
Delaware	1909	77	1,556	103	84	1,369	1,725	1,520	41	273	1,553	2,106	553
	1904	59	1,122	86	37	999	1,274	1,005	18	187	1,031	1,456	425
	1899	54	1,543	77	29	1,437	1,736	969	14	226	1,089	1,579	490
Florida	1909	18	221	18	15	188	70	231	11	51	80	213	133
	1904	10	216	12	20	184	56	105	8	28	92	165	73
	1899	9			8	153		84	7	33	52	109	57
Georgia	1909	26	479	27	24	428	318	141	16	66	196	321	123
	1904	9	606	9	18	579		114	11	55	160	270	110
	1899	8	90	5	4	81		25	4	11	67	120	53
Illinois	1909	118	2,800	113	304	2,383	4,305	5,630	367	904	4,813	7,620	2,807
	1904	125	2,533	166	221	2,146	2,630	4,007	225	827	4,316	7,044	2,728
	1899	122			313	2,121		2,470	202	641	3,750	5,864	2,114
Indiana	1909	134	3,952	60	486	3,406	6,398	5,572	515	879	5,945	8,758	2,813
	1904	110	3,760	55	269	3,426	4,738	3,982	220	862	3,574	5,894	2,320
	1899	69			191	2,152		1,528	143	436	1,921	3,145	1,224
Iowa	1909	71	1,420	27	146	1,247	2,989	3,503	134	299	1,568	2,549	981
	1904	59	1,769	27	135	1,607	2,816	2,920	126	418	2,118	3,675	1,557
	1899	39			91	1,021		1,497	75	254	1,181	2,121	940
Kansas	1909	8	149	4	25	120	170	282	22	46	185	286	101
	1904	4	113	2	11	100	103	131	4	22	51	90	39
	1899	5			11	116		30	3	17	88	114	46
Kentucky	1909	36	876	38	185	653	907	1,562	168	177	1,093	1,857	764
	1904	16	607	13	74	520	591	724	69	101	706	1,096	390
	1899	12			32	493		242	25	74	281	512	231
Louisiana	1909	26	1,124	59	91	974	659	1,393	107	183	573	978	405
	1904	19	722	21	87	614	344	1,001	55	144	638	1,173	637
	1899	15	451	27	28	398		285	22	92	252	427	175
Maine	1909	245	4,410	252	308	3,850	4,355	5,114	321	1,138	5,125	7,689	2,564
	1904	235	4,073	245	341	3,487	3,018	3,432	244	1,305	4,240	7,267	3,027
	1899	179	7,010	236	284	6,490		9,359	195	1,393	3,380	6,170	2,790
Maryland	1909	468	9,755	655	487	8,613	7,007	8,377	351	1,926	10,090	13,709	3,619
	1904	408	10,167	582	439	9,146	5,799	7,151	332	1,790	9,173	12,935	3,782
	1899	297			296	9,223		5,368	287	1,772	10,627	14,533	3,906
Massachusetts	1909	71	1,819	61	309	1,449	1,043	4,112	324	642	4,583	6,840	2,257
	1904	85	1,663	116	205	1,342	570	2,838	180	572	4,815	6,574	1,759
	1899	95			227	1,746		2,309	187	623	4,599	6,334	1,735
Michigan	1909	104	2,387	88	226	2,073	3,374	4,495	226	665	3,074	4,971	1,897
	1904	134	2,319	122	175	2,022	2,636	2,281	150	621	2,374	3,817	1,443
	1899	117	1,650	140	110	1,400		1,096	93	310	1,821	2,657	836

¹ Less than \$500.

² Excluding statistics for one establishment, to avoid disclosure of individual operations.

³ Excluding statistics for two establishments, to avoid disclosure of individual operations.

CANNING AND PRESERVING, ALL BRANCHES COMBINED—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

Table 22—Continued.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
Minnesota.....	1909	32	525	18	92	415	692	\$993	\$82	\$135	\$895	\$1,343	\$448
	1904	¹ 31	352	20	69	263	540	642	66	89	435	778	343
	1899	9						226	31	33	212	333	121
Mississippi.....	1909	11	904	2	55	847	378	674	74	97	508	824	316
	1904	¹ 11	827	13	57	757	550	980	31	172	1,032	1,506	474
	1899	8	672	6	16	650	214	328	17	123	618	907	289
Missouri.....	1909	222	1,705	548	205	952	974	1,781	127	186	1,005	1,574	669
	1904	75	972	78	136	758	1,154	1,018	72	171	849	1,323	474
	1899	¹ 55			145	840		704	90	192	983	1,529	546
Nebraska.....	1909	12	250	7	28	215	569	511	29	63	269	481	212
	1904	¹ 8	317	5	20	292	378	357	11	62	309	559	250
	1899	5	176	6	9	161	127	124	6	22	131	211	80
New Hampshire.....	1909	6	37	7	4	26	60	54	3	10	31	53	22
	1904	¹ 4	19	3	1	15	44	26	1	4	10	21	11
	1899	² 3	26	6	1	19		22	1	6	21	30	9
New Jersey.....	1909	84	2,051	85	148	1,818	2,698	2,765	118	546	2,208	3,664	1,456
	1904	² 76	1,878	94	84	1,700	2,076	1,948	52	399	1,701	2,992	992
	1899	¹ 93			140	2,403		2,275	113	561	2,271	3,521	1,250
New York.....	1909	790	8,818	879	864	7,075	12,469	15,825	916	2,563	11,669	19,040	7,371
	1904	¹ 666	9,171	750	864	7,796	9,741	12,822	652	2,409	9,829	16,821	6,992
	1899	604			457	6,384		8,159	411	1,791	7,735	12,506	4,771
North Carolina.....	1909	21	212	18	6	188	230	93	4	25	75	144	69
	1904	23	249	34	16	199	223	126	5	30	153	222	69
	1899	² 19	100	20	2	78		30	(*)	11	44	64	20
Ohio.....	1909	107	2,379	94	276	2,009	4,244	3,494	252	532	3,102	4,660	1,558
	1904	107	2,484	121	219	2,144	3,580	2,597	192	577	2,701	4,491	1,790
	1899	² 97	2,223	113	148	1,962		1,430	120	438	1,931	3,247	1,316
Oregon.....	1909	71	844	54	129	661	1,318	4,162	146	315	2,187	3,207	1,020
	1904	² 48	671	39	103	529	1,247	1,899	101	250	1,894	2,911	1,017
	1899	45	888	29	68	791		2,708	67	244	1,298	1,994	696
Pennsylvania.....	1909	83	4,379	97	1,529	2,753	3,474	8,867	1,518	947	4,665	9,484	4,819
	1904	¹ 89	3,405	97	1,093	2,215	2,894	6,156	1,123	762	4,033	8,065	4,032
	1899	¹ 77			797	2,197		3,499	730	637	2,927	6,039	3,112
South Carolina.....	1909	15	495	14	14	467	95	286	19	64	159	318	159
	1904	¹ 14	1,080	16	20	1,044	287	202	14	349	574	574	225
	1899	14			7	126		36	1	13	20	51	31
Tennessee.....	1909	37	375	45	27	303	450	274	11	39	131	206	75
	1904	16	231	16	12	203	360	90	10	30	151	242	91
	1899	11	151	19	16	116	75	36	2	15	38	72	34
Texas.....	1909	19	217	12	47	158	243	346	53	45	201	498	297
	1904	20	150	16	15	119	227	128	7	23	208	332	124
	1899	¹ 17	158	14	12	132		101	9	33	120	226	106
Utah.....	1909	24	461	7	58	396	847	1,161	63	123	716	1,059	343
	1904	² 18	411	6	36	369	500	928	25	99	506	802	296
	1899	¹ 8	169	8	20	141	310	304	8	38	211	300	89
Vermont.....	1909	8	142	11	13	118	240	319	14	46	214	330	116
	1904	7	69	4	8	57	124	98	5	17	63	123	60
	1899	8			7	128		110	6	28	108	207	99
Virginia.....	1909	325	2,427	476	91	1,860	1,382	1,129	35	277	1,208	1,854	646
	1904	¹ 170	1,377	262	44	1,071	1,048	688	16	181	791	1,218	427
	1899	¹ 99	867	143	34	690		263	6	89	397	633	236
Washington.....	1909	80	2,284	27	228	2,029	2,433	7,355	292	1,272	5,046	9,595	4,549
	1904	61	834	38	107	689	1,491	2,261	112	380	2,351	3,617	1,266
	1899	60	2,463	58	124	2,281		2,349	100	746	3,238	5,090	1,852
West Virginia.....	1909	30	345	49	25	271	494	390	24	58	430	605	175
	1904	19	394	30	37	327	424	353	34	84	387	764	377
	1899	14	620	11	44	565		370	43	84	419	774	355
Wisconsin.....	1909	83	2,044	27	241	1,776	4,915	6,110	222	639	2,967	4,807	1,840
	1904	59	1,506	21	174	1,311	2,962	2,940	155	426	2,012	3,291	1,279
	1899	36			58	770		819	46	148	702	1,359	657
All other states.....	1909	13	174	7	30	137	184	278	37	53	204	365	161
	1904	38	607	32	51	524	754	1,242	56	209	819	1,385	666
	1899	26			45	903		330	35	177	604	921	317

¹ Excluding statistics for one establishment, to avoid disclosure of individual operations.

² Excluding statistics for two establishments, to avoid disclosure of individual operations.

* Less than \$500.

Table 23		PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS ON A REPRESENTATIVE DAY.					Primary horse-power.
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.				
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.			
								Maximum month.	Minimum month.								
1 United States.....	3,767	71,972	4,244	2,676	4,028	1,056	59,968	Se 154,800	Ja 19,998	155,847	67,219	77,593	4,640	6,395	81,179		
2 Alabama.....	10	67	19	1	1	1	46	Au 136	Ja ¹ 0	195	33	112	22	28	51		
3 Arkansas.....	44	379	65	14	6	2	292	Se 1,057	Mh 4	1,354	456	789	22	87	428		
4 California.....	196	8,714	148	285	382	142	7,757	Au 16,047	Fe 2,781	15,034	6,231	8,472	117	214	7,453		
5 Colorado.....	30	630	15	37	42	18	518	Au 1,161	Mh ¹ 157	1,314	436	867	5	6	1,349		
6 Connecticut.....	12	166	8	7	16	7	128	Se 300	Ap 62	306	143	163	.....	.....	199
7 Delaware.....	77	1,556	103	35	41	8	1,369	Se 6,413	Ja 11	5,935	1,931	3,163	315	526	1,725		
8 Florida.....	18	221	18	7	7	1	188	De 311	Au 30	491	234	223	18	16	70		
9 Georgia.....	26	479	27	15	9	.....	428	Jy 1,251	My 7	1,646	651	810	90	95	318	
10 Illinois.....	118	2,800	113	114	140	50	2,383	Se 6,539	Ja 1,013	4,996	2,428	2,399	82	87	4,305		
11 Indiana.....	134	3,952	60	163	262	61	3,406	Se 11,600	Ja 759	7,490	3,197	4,060	126	107	6,398		
12 Iowa.....	71	1,420	27	96	34	16	1,247	Se 5,642	Fe 217	5,583	3,105	2,159	157	162	2,989		
13 Kansas.....	8	149	4	6	17	2	120	Au 274	Mh ¹ 49	186	81	72	17	16	170		
14 Kentucky.....	36	876	38	55	105	25	653	Se 1,778	Ja 262	1,711	654	986	19	52	907		
15 Louisiana.....	26	1,124	59	33	56	2	974	Oc 1,213	Je 377	1,619	669	820	65	65	659		
16 Maine.....	245	4,410	252	201	50	57	3,550	Se 10,131	Ja 588	10,464	5,838	4,482	83	61	4,355		
17 Maryland.....	468	9,755	655	204	245	38	8,613	Se 31,131	Ja 1,227	28,151	9,742	14,600	1,581	2,228	7,007		
18 Massachusetts.....	71	1,819	61	70	160	79	1,449	Oc 1,769	My 1,220	1,746	1,272	447	14	13	1,043		
19 Michigan.....	104	2,387	88	96	110	30	2,073	Se 4,172	Ja 654	3,603	1,696	1,841	40	26	3,374		
20 Minnesota.....	32	525	18	37	45	10	415	Se 1,438	Fe 198	1,157	594	456	61	46	692		
21 Mississippi.....	11	904	2	30	19	6	847	De 1,358	My 140	1,371	550	524	140	157	378		
22 Missouri.....	222	1,705	548	95	98	12	952	Se 4,597	Ja 178	4,701	1,394	2,509	274	524	974		
23 Nebraska.....	12	250	7	18	10	.....	215	Au 909	Ja 44	940	551	297	49	43	569	
24 New Hampshire.....	6	37	7	3	1	.....	26	Se 153	Jy 0	148	92	56	.....	.....	60
25 New Jersey.....	84	2,051	85	61	67	20	1,818	Se 6,021	Ja 273	5,650	2,191	3,436	21	2	2,698		
26 New York.....	790	8,818	879	293	458	113	7,075	Oc 15,475	Fe 2,058	17,198	7,540	9,483	102	73	12,469		
27 North Carolina.....	21	212	18	6	.....	.....	188	Au 394	Ap 75	519	166	249	58	46	230
28 Ohio.....	107	2,379	94	116	129	31	2,009	Se 5,868	Ap 581	6,292	2,869	3,321	56	46	4,244		
29 Oklahoma.....	3	10	1	2	.....	.....	7	Se 33	Ja ¹ 0	30	9	13	5	3	41
30 Oregon.....	71	844	54	65	49	15	661	Se 1,588	Fe 113	1,452	866	535	15	36	1,318		
31 Pennsylvania.....	83	4,379	97	96	1,200	233	2,753	Se 4,092	Ja 1,847	3,329	1,717	1,490	60	62	3,474		
32 South Carolina.....	15	495	14	11	2	1	467	Mh 974	My ¹ 3	1,088	374	552	82	80	95		
33 Tennessee.....	37	375	45	21	6	.....	303	Au 1,411	Mh 3	1,423	430	787	91	115	450	
34 Texas.....	19	217	12	18	26	3	158	Jy 258	Ja 91	317	117	177	15	8	243		
35 Utah.....	24	461	7	32	17	9	396	Se 1,256	Fe 69	1,246	488	690	29	39	847		
36 Vermont.....	8	142	11	8	2	3	118	Se 634	Mh 8	644	453	117	49	25	240		
37 Virginia.....	325	2,427	476	62	21	8	1,860	Se 7,469	Ja 181	7,473	2,175	3,675	578	1,045	1,382		
38 Washington.....	80	2,284	27	98	108	22	2,029	Au 3,972	Ja 483	3,011	2,261	707	20	23	2,433		
39 West Virginia.....	30	345	49	10	10	5	271	Se 944	Ap ¹ 65	913	211	463	74	165	494		
40 Wisconsin.....	83	2,044	27	155	66	20	1,776	Jy 6,560	Ja 292	4,845	3,291	1,398	88	68	4,915		
41 All other states.....	10	164	6	10	13	5	130	.....	.....	276	83	193	.....	.....	143

¹ Same number reported for one or more other months.

CANNING AND PRESERVING.

COMBINED—DETAILED STATISTICS, BY STATES: 1909.

Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
	Total.	Services.			Materials.		Miscellaneous.					
		Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1 \$119,207,127	\$141,486,156	\$3,727,426	\$4,136,197	\$19,081,843	\$1,651,363	\$100,271,696	\$560,148	\$524,131	\$501,173	\$11,142,179	\$157,101,201	\$55,278,142
2 21,715	23,799	360	90	5,443	231	16,262	500	160	.....	753	24,867	8,374
3 255,452	252,631	7,191	1,680	54,172	6,416	174,414	614	1,030	125	6,989	278,903	98,073
4 18,316,474	31,003,217	593,052	487,351	3,453,555	251,413	23,757,809	85,565	70,857	59,247	2,244,368	32,914,829	8,905,607
5 1,486,325	1,219,959	63,835	43,385	250,241	19,978	652,449	11,277	6,561	.....	172,233	1,527,779	855,352
6 329,344	275,430	12,020	13,582	45,127	3,924	171,097	8,656	1,657	.....	19,367	345,740	170,719
7 1,520,082	1,937,437	26,098	15,008	273,394	21,042	1,532,454	2,427	2,291	362	64,361	2,105,945	552,449
8 231,213	252,631	6,252	4,750	80,873	2,882	76,893	1,373	716	.....	30,337	278,903	133,545
9 141,377	280,181	9,496	6,452	56,375	2,587	195,762	1,305	1,126	50	7,028	321,287	122,938
10 5,629,637	6,704,951	201,452	165,382	903,632	73,393	4,739,303	65,786	26,637	10,383	518,983	7,619,586	2,806,890
11 5,571,578	7,934,999	184,719	330,486	878,619	73,833	5,870,828	9,212	31,117	2,211	553,974	8,758,343	2,813,682
12 3,503,214	2,232,525	88,268	45,546	298,543	24,711	1,543,178	4,000	15,292	1,706	211,281	2,549,377	981,488
13 282,366	286,034	7,425	14,480	46,243	3,830	181,356	420	1,421	.....	30,859	285,532	100,346
14 1,561,612	1,701,913	59,289	108,813	177,326	11,170	1,082,171	10,920	6,890	.....	245,334	1,856,895	763,554
15 1,392,777	965,479	58,692	48,567	182,657	17,103	555,995	7,554	5,992	1,550	87,369	977,763	404,665
16 5,113,760	6,996,964	265,362	55,389	1,137,879	97,483	5,027,435	23,297	27,317	4,961	357,841	7,683,833	2,563,915
17 8,376,649	12,937,109	199,848	151,642	1,925,962	125,292	9,964,342	56,452	34,743	6,014	472,814	13,709,449	3,619,815
18 4,112,374	6,124,796	156,915	166,662	642,102	33,235	4,549,662	43,691	26,022	600	505,907	6,840,306	2,257,409
19 4,494,997	4,234,116	118,611	107,116	664,685	63,211	3,010,709	6,216	22,762	94	240,712	4,970,911	1,896,991
20 992,892	1,207,872	38,880	43,491	134,592	11,153	883,642	9,482	3,611	173	82,948	1,343,021	448,226
21 673,900	746,974	58,975	15,020	97,131	14,439	493,403	420	5,799	.....	61,787	824,233	316,391
22 1,780,772	1,452,513	43,232	83,973	185,873	14,374	990,635	8,340	4,422	.....	121,664	1,573,835	568,826
23 511,446	427,490	15,302	14,070	62,669	6,411	262,870	358	2,568	.....	63,242	480,500	211,219
24 53,876	47,022	2,760	520	9,832	657	30,137	250	243	.....	2,623	53,344	22,550
25 2,764,544	3,091,797	77,504	40,838	546,114	32,457	2,175,632	23,831	9,850	50	185,421	3,664,098	1,456,009
26 15,824,766	16,923,102	451,347	464,385	2,563,194	307,725	11,361,060	83,398	46,688	3,024	1,642,281	19,039,735	7,370,950
27 93,474	120,409	3,980	.....	24,610	2,872	72,098	740	2,057	5,600	8,452	143,691	68,721
28 3,493,904	4,226,322	124,787	127,240	532,219	39,086	3,063,093	18,912	18,354	10,695	291,936	4,659,674	1,557,495
29 14,923	2,437	258	.....	739	150	1,108	.....	97	.....	85	2,822	1,564
30 4,162,401	2,899,916	96,907	49,134	315,208	42,918	2,144,514	3,400	14,946	64,954	167,935	3,207,060	1,019,628
31 8,866,817	8,583,518	252,268	1,265,804	947,171	59,570	4,604,963	21,501	42,785	3,626	1,390,830	9,434,026	4,819,493
32 286,426	253,967	12,400	6,605	63,949	4,572	153,979	1,283	2,161	.....	9,018	318,081	159,530
33 274,022	190,526	8,995	1,848	39,276	2,671	127,982	691	959	550	7,554	206,063	75,415
34 345,721	338,451	18,210	35,001	44,764	2,747	197,997	2,457	1,568	.....	35,707	498,196	297,452
35 1,161,399	984,198	44,470	18,919	123,359	12,242	703,529	1,600	6,022	3,500	70,557	1,059,487	343,716
36 318,759	301,615	8,650	5,570	46,453	3,911	210,406	1,350	540	.....	24,735	330,435	116,118
37 1,128,576	1,573,307	23,567	11,713	277,153	19,961	1,188,306	3,377	4,104	2,703	42,423	1,854,318	640,051
38 7,355,195	7,694,518	186,969	105,326	1,271,704	80,491	4,965,032	11,771	44,095	318,045	711,085	9,595,387	4,549,864
39 389,743	557,517	7,701	16,796	57,617	3,258	426,739	335	1,624	205	43,242	604,794	174,797
40 6,109,577	4,294,536	173,515	48,976	638,623	53,775	2,912,972	15,158	26,671	745	424,101	4,807,454	1,840,707
41 263,048	302,533	17,864	14,587	52,765	4,189	199,480	2,229	2,276	.....	9,143	361,277	157,608

* All other states embrace: Arizona, 2 establishments; District of Columbia, 2; Idaho, 2; New Mexico, 1; North Dakota, 1; Rhode Island, 2.

FLOUR-MILL AND GRISTMILL
PRODUCTS

FLOUR-MILL AND GRISTMILL INDUSTRY.

GENERAL STATISTICS.

Summary for the United States: 1909.—Table 1 presents a summary of the statistics of the flour-mill and gristmill industry as a whole for 1909. It distinguishes three classes of mills: (1) Merchant mills whose chief products are intended for human consumption, (2) merchant mills whose chief products are those commonly used as feed for live stock, and (3) mills engaged exclusively in custom grinding. Mills reporting the purchase of any part of the grain which they grind are classified as merchant mills, even though a large part of their business may consist in custom grinding. Custom mills, on the other hand, are those engaged exclusively in custom grinding, whether for toll or for a stipulated charge, including those where grain already ground is sometimes given in exchange for the grain to be ground. Practically all of the custom mills are very small, and so also are a considerable number of the merchant mills.

	FLOUR MILLS AND GRISTMILLS, MERCHANT AND CUSTOM: 1909			
	Total.	Merchant mills.		Custom mills.
		Manufacturing chiefly for human consumption.	Manufacturing chiefly feed for live stock.	
Number of establishments.....	23,652	9,162	2,529	11,961
Persons engaged in the industry.....	88,849	59,188	6,866	22,795
Proprietors and firm members.....	30,204	11,365	3,205	15,634
Salaried employees.....	12,178	11,378	653	147
Wage earners (average number).....	46,467	36,445	3,008	7,014
Primary horsepower.....	1,126,347	1,853,584	(2)	272,763
Capital.....	\$370,410,289	\$326,654,430	\$22,497,349	\$21,258,510
Expenses.....	\$875,632,914	\$781,274,162	\$46,248,187	\$48,110,565
Services.....	\$35,167,693	\$32,062,511	\$1,918,642	\$1,186,540
Salaries.....	\$12,564,595	\$12,021,161	\$495,606	\$47,828
Wages.....	\$22,603,098	\$20,041,350	\$1,423,036	\$1,138,712
Materials.....	\$813,891,347	\$724,294,494	\$43,281,985	\$46,314,868
Miscellaneous.....	\$26,573,874	\$24,917,157	\$1,047,560	\$609,157
Value of products.....	\$938,699,958	\$832,790,364	\$50,794,041	\$55,115,553
Value added by manufacture (value of products less cost of materials).....	\$124,808,611	\$108,495,870	\$7,512,056	\$8,800,685
Grain ground, bushels.....	872,950,743	736,013,881	70,234,080	66,702,782

¹ Total for merchant mills.

² Not tabulated separately.

Of the 23,652 mills canvassed for 1909, more than half (11,961) were custom mills, but of the total value of products—\$938,699,958—only \$55,115,553, or 5.9 per cent, was contributed by this class of mills. More than three-fourths of the merchant mills were engaged chiefly in the manufacture of wheat flour and other products intended for human consumption, and the value of the products of these mills was \$832,790,364, or 88.7 per cent of the total for all mills combined.

For both custom and merchant mills the value of products includes the estimated value of the flour and other products obtained from grain ground on a custom basis, and, similarly, the figures for cost of materials include the estimated cost of such grain.

The merchant mills reported receipts for custom work (including the value of grain taken as toll) to the amount of \$7,362,488, and the custom mills similar receipts to the amount of \$5,084,537. The large amount returned by the merchant mills is explained by the fact, already stated, that every mill that did any merchant grinding was classified as a merchant mill, even though custom grinding formed the larger part of the business.

The flour-mill and gristmill industry is one in which the cost of materials constitutes a very large proportion of the total value of products, the process of manufacture itself being relatively simple and inexpensive. The total cost of the materials used by all mills in 1909 was \$813,891,347, which was equal to about seven-eighths (86.7 per cent) of the total value of products, while the value added by manufacture (that is, the value of products less the cost of materials) was only \$124,808,611.

The flour mills and gristmills of all classes combined gave employment to an average of 88,849 persons, of whom 46,467 were wage earners, and paid out \$35,167,693 in salaries and wages. The quantity of grain ground was 872,950,743 bushels, the greater part being wheat and corn.

At the census of 1904 mills engaged exclusively in custom grinding were omitted from the canvass, and the figures for such mills were also eliminated from the comparative statistics for 1899 which were published in the report for 1904, although custom mills had been canvassed at the census of 1899. On account of the omission of custom mills at the census of 1904 it seemed best, in presenting the general statistics of manufactures included in other bulletins and reports, to confine the statistics for 1909 for the industry included under the designation "Flour-mill and gristmill products" to merchant mills, showing the statistics for custom mills separately and not including them in the grand total for all industries. Moreover, in most tables of this special report on the flour-mill and gristmill industry only merchant mills are represented, Tables 1, 2, 16, and 25 being the only ones which contain statistics for custom mills.

Comparison with earlier censuses.—Table 2 summarizes the statistics of the flour-mill and gristmill industry (merchant mills and custom mills combined) for each decennial census from 1859 to 1909, inclusive. The reports for the censuses prior to 1899 included, without distinction, both merchant mills and custom

mills. As custom mills were not canvassed at the census of 1904, no statistics for that year are shown.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	FLOUR MILLS AND GRISTMILLS, MERCHANT AND CUSTOM COMBINED.						PER CENT OF INCREASE. ¹				
	1909	1899	1889	1879	1869	1859	1899-1909	1889-1899	1879-1889	1869-1879	1859-1869
Number of establishments.....	23,652	25,258	18,470	24,338	22,573	13,868	-6.4	36.8	-24.1	7.8	62.8
Persons engaged in the industry.....	88,849	73,103	(²)	(²)	(²)	(²)	21.5	.....	.....	.....	.....
Proprietors and firm members.....	30,204	30,240	(²)	(²)	(²)	(²)	-0.1	.....	.....	.....	.....
Salaried employees.....	12,178	5,790	(²)	(²)	(²)	(²)	110.3	.....	.....	.....	.....
Wage earners (average number)	46,467	37,073	47,403	58,407	58,448	27,682	25.3	-21.8	(³)	(³)	(³)
Primary horsepower.....	1,126,347	1,014,872	752,365	771,201	576,686	(²)	11.0	34.9	-2.4	33.7	.....
Capital.....	\$370,410,289	\$218,714,104	\$208,473,500	\$177,361,878	\$151,565,376	\$84,535,004	69.4	4.9	17.6	17.0	79.2
Expenses.....	\$875,632,914	\$509,260,101	(²)	(²)	(²)	(²)	71.9	.....	.....	.....	.....
Services.....	\$35,167,693	\$23,108,168	(²)	(²)	(²)	(²)	52.2	.....	.....	.....	.....
Salaries.....	\$12,564,595	\$5,404,750	(²)	(²)	(²)	(²)	132.5	.....	.....	.....	.....
Wages.....	\$22,603,098	\$17,703,418	\$18,138,402	\$17,422,316	\$14,577,533	\$8,721,391	27.7	-2.4	(³)	(³)	(³)
Materials.....	\$813,891,347	\$475,826,345	\$434,152,290	\$441,545,225	\$367,392,122	\$208,497,309	71.0	9.6	-1.7	20.2	76.2
Miscellaneous.....	\$26,573,874	\$10,325,588	\$13,162,037	(²)	(²)	(²)	157.4	-21.6	.....	.....	.....
Value of products.....	\$938,699,958	\$560,719,063	\$513,971,474	\$505,185,712	\$444,985,143	\$248,580,365	67.4	9.1	1.7	13.5	79.0
Value added by manufacture (value of products less cost of materials).	\$124,808,611	\$84,892,718	\$79,819,184	\$63,640,487	\$77,593,021	\$40,083,056	47.0	6.4	25.4	-18.0	93.6
Grain ground, bushels.....	872,950,743	835,143,625	627,016,175	539,682,957	366,548,969	.....	4.5	33.2	16.2	47.2	.....

¹ A minus sign (-) denotes decrease.

² Comparable figures not available.

³ Percentage omitted because figures are not strictly comparable.

The milling industry was one of the first to be established in the United States, and its growth for the last 40 years has corresponded roughly to the growth of the population. The industry has been stimulated at certain periods, however, by such factors as the rapid increase in the production of grain which has followed the opening of new agricultural lands, and the development of facilities for exporting flour-mill and gristmill products. The quantities of grain ground in any single year are likely, also, to be materially affected by the size of the grain crop of the corresponding year. The percentage of increase in the quantity of grain ground for the period 1869-1909 was practically the same as the percentage of increase in population. For individual decades, however, the percentages are not even approximately equal. In the decade 1899-1909 the quantity of grain ground increased only 4.5 per cent, while the population increased 21 per cent between 1900 and 1910.

The value of products reported for 1909 was almost four times as great as the value for 1859, but a part of the increase was due to an advance in the prices of grain between 1859 and 1869, the advance in prices between 1899 and 1909, though considerable, not being sufficient to make up for the decline that had taken place between 1869 and 1899. From 1869, the first year in which the quantity of grain ground was reported, to 1909, the value of products increased 111 per cent, while the quantity of grain ground increased 138.2 per cent. The increase for the decade 1899-1909 in the quantity of grain used was much less than the corresponding increase for any of the earlier decades for which statistics are available, but on account of the increase in prices, already referred to, the rate of increase in value of products was decidedly higher than that shown for any of the three preceding decades.

By reason of the introduction of elaborate machinery and improved methods the average capacity of the mills has increased materially. In 1869 the average quantity of grain ground per establishment was 16,238 bushels, while in 1909 the average was 36,908 bushels. These figures, however, by no means show the extent of the change which has taken place in the capacity of the larger mills, as the average for the later censuses has been kept down by the continued presence of a great number of very small mills.

In many of the small mills the greater part of the work is done by the proprietors or their immediate representatives, while in the large flour mills, although numerous wage earners are employed, the use of automatic machinery has brought about a reduction in the number employed in securing a given output. Therefore, the number of small mills being relatively large, proprietors and firm members form a considerable proportion of the total number of persons engaged in the industry. As these were not reported separately prior to 1899, it is probable that a considerable number were included with the wage earners. Salaried employees were also included to some extent with wage earners at the earlier censuses. This condition explains at least in part the apparent decrease in the number of wage earners shown for some of the census periods. The statistics for the censuses of 1899 and 1909 are more exactly comparable than those for the other censuses. Between 1899 and 1909 the average number of wage earners increased 25.3 per cent, but the number of proprietors and firm members decreased slightly, doubtless on account of the decrease in the number of establishments reported.

Summary for merchant mills.—The most important statistics for merchant mills, as reported at the censuses of 1909, 1904, and 1899, are given in Table 3.

Table 3

	MERCHANT FLOUR MILLS AND GRISTMILLS.					
	Number or amount.			Per cent of increase.		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments.....	11,691	10,051	9,476	23.4	16.3	6.1
Persons engaged in the industry.....	66,054	59,623	(1)	(1)	10.8	(1)
Proprietors and firm members.....	14,570	13,098	(1)	(1)	11.2	(1)
Salaried employees.....	12,031	7,415	5,522	117.9	62.3	34.3
Wage earners (average number).....	39,453	39,110	32,226	22.4	0.9	21.4
Primary horsepower.....	853,584	775,318	670,719	27.3	10.1	15.6
Capital.....	\$349,151,779	\$265,117,434	\$189,281,330	84.5	31.7	40.1
Expenses.....	\$827,522,349	\$666,902,425	\$459,251,093	80.2	24.1	45.2
Services.....	\$33,981,153	\$27,174,553	\$21,543,154	57.7	25.0	26.1
Salaries.....	\$12,516,767	\$7,352,357	\$5,257,991	138.1	70.2	39.8
Wages.....	\$21,464,386	\$19,822,196	\$16,285,163	31.8	8.3	21.7
Materials.....	\$767,576,479	\$619,971,161	\$428,116,757	79.3	23.8	44.8
Miscellaneous.....	\$25,964,717	\$19,756,711	\$9,591,182	170.7	31.4	106.0
Value of products.....	\$883,584,405	\$713,033,395	\$501,396,304	76.2	23.9	42.2
Value added by manufacture (value of products less cost of materials).....	\$116,007,926	\$93,062,234	\$73,279,547	58.3	24.7	27.0
Grain ground, bushels.....	806,247,961	754,945,729	729,061,820	10.6	6.8	3.6

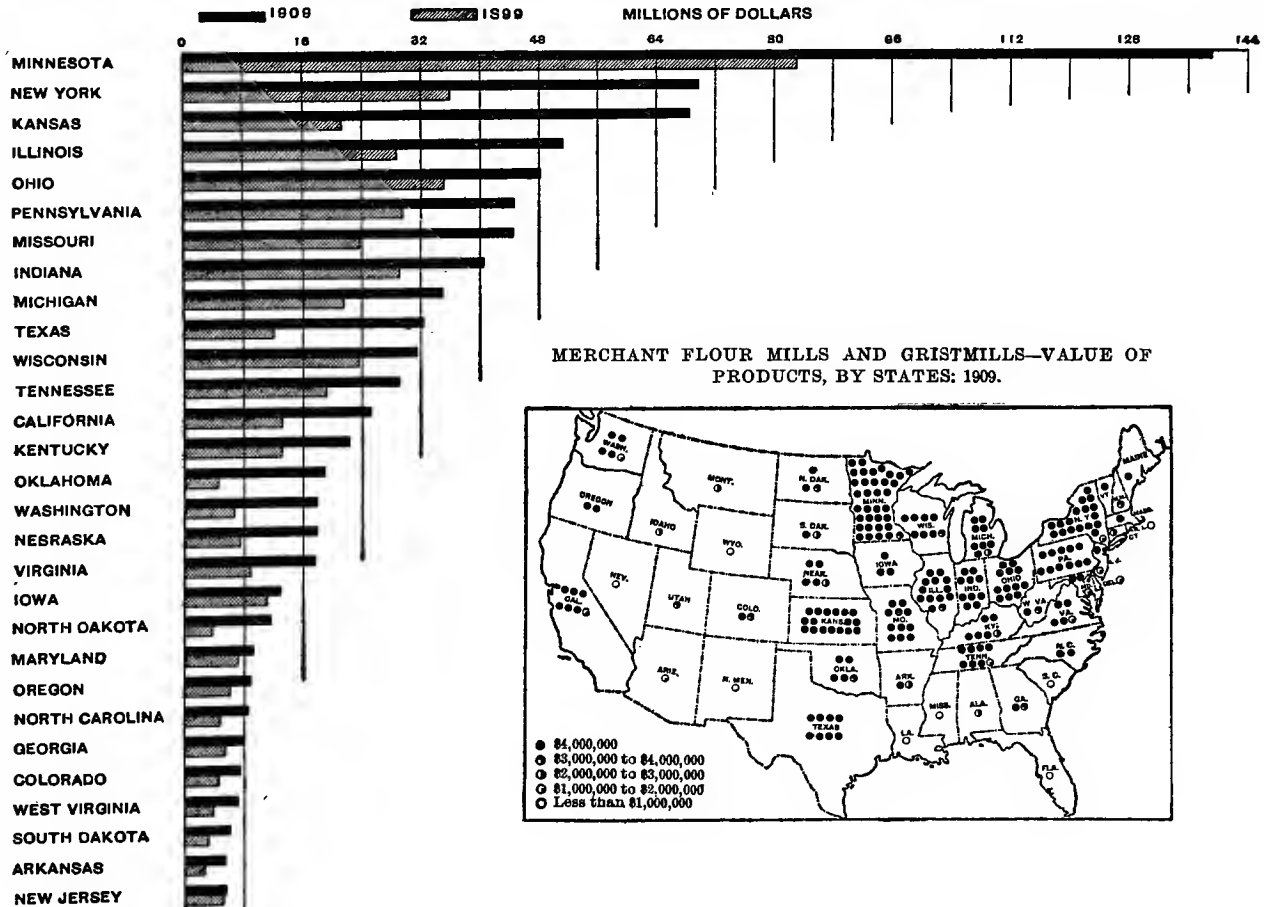
¹ Figures not available.

In general, this table indicates a considerable growth in the industry during the decade. The increase in the quantity of grain ground affords the most accurate measure of the development of the industry. The total quantity of grain used in the

merchant mills in 1909 was 10.6 per cent greater than the quantity used in 1899. The year 1909 was not especially prosperous for the milling industry, however, and in some localities that year showed an actual decline in production as compared with 1904. The average amount of grain ground per establishment decreased from 76,938 bushels in 1899 to 75,112 in 1904 and 68,963 in 1909. The decrease in this average is due primarily to the fact that a larger number of the small establishments were covered by the canvass at each succeeding census. The relative increase in value of products and in cost of materials from 1899 to 1909 was greater than that in quantity of grain used or of products manufactured, the prices of materials and products having advanced considerably during the decade.

Summary for merchant mills, by states.—The flour-mill and gristmill industry is well distributed throughout the United States, some establishments being reported for every state. Table 4 summarizes the more important statistics by states, the states being arranged according to the value of products reported for 1909, while the diagram and map below show graphically the distribution of the industry by states.

MERCHANT FLOUR MILLS AND GRISTMILLS—VALUE OF PRODUCTS, FOR LEADING STATES: 1909 AND 1899.



in 1909 as in respect to value of products. Illinois was a conspicuous exception, ranking fourth in value of products, but only eighth in value added by manufacture. The majority of the states had the same or nearly the same rank with respect to value of products in 1909 as in 1904. The data as to value of products, by states, are shown in the diagram and map on page 5.

Persons engaged, merchant mills.—Table 5 shows, for 1909, the number of persons engaged in the operation of merchant mills, classified according to occupational status and sex, and in the case of wage earners according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED—MERCHANT FLOUR MILLS AND GRISTMILLS: 1909		
	Total.	Male.	Female.
All classes	66,054	63,492	2,562
Proprietors and officials.....	18,763	18,286	477
Proprietors and firm members.....	14,570	14,111	459
Salaried officers of corporations.....	1,486	1,473	13
Superintendents and managers.....	2,707	2,702	5
Clerks.....	7,838	6,284	1,554
Wage earners (average number).....	39,453	38,922	531
16 years of age and over.....	39,320	38,796	524
Under 16 years of age.....	133	126	7

The average number of persons engaged in the operation of merchant mills during 1909 was 66,054, of whom 39,453, or 59.7 per cent, were wage earners, 18,763, or 28.4 per cent, proprietors and officials, and 7,838, or 11.9 per cent, clerks. Of the total number of persons engaged in this branch of the industry, 63,492, or 96.1 per cent, were males, and 2,562, or 3.9 per cent, females. About three-fifths of the females were clerks, the average number of female wage earners being only 531. The average number of children under 16 years of age employed as wage earners was only 133. In connection with these figures it may be noted that the wage earners in the flour mills and gristmills are mainly engaged in tending elaborate machinery or in handling heavy commodities.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 23. The distribution of the average number by sex and age is not shown for the individual states, but Table 24 gives such a distribution for the number employed on December 15, or the nearest representative day. Female wage earners were reported from only 29 states. The largest number, 135, was reported for the state of New York, and the next largest number, 112, for Ohio. The few employees under 16 years of age were fairly well distributed among the states.

In order to compare the distribution of the persons engaged in the industry according to occupational

status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 6.

CLASS.	PERSONS ENGAGED—MERCHANT FLOUR MILLS AND GRISTMILLS.				Percent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total	66,054	100.0	59,623	100.0	10.8
Proprietors and firm members.....	14,570	22.1	13,098	22.0	11.2
Salaried employees.....	12,031	18.2	7,415	12.4	62.3
Wage earners (average number).....	39,453	59.7	39,110	65.6	0.9

Salaried employees show the greatest percentage of increase. Although wage earners at both censuses represented considerably more than half the total number of persons engaged in the branch of industry here under consideration, their number increased only nine-tenths of 1 per cent from 1904 to 1909.

Table 7 shows the average number of wage earners in merchant mills distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899. As already explained, the distribution for 1909 was estimated on the basis of the actual numbers reported for a single representative day. (See Introduction.) The numbers of women and children employed were so small that the increases between 1904 and 1909 have little significance.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN MERCHANT FLOUR MILLS AND GRISTMILLS.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total	39,453	100.0	39,110	100.0	32,226	100.0
16 years of age and over.....	39,320	99.7	39,022	99.8	32,133	99.7
Male.....	38,796	98.3	38,572	98.6	31,719	98.4
Female.....	524	1.3	450	1.2	414	1.3
Under 16 years of age.....	133	0.3	88	0.2	93	0.3

Wage earners employed in merchant mills, by months.—Table 8 gives the number of wage earners employed in merchant mills on the 15th (or the nearest representative day) of each month during the year 1909 for the 20 states in which an average of 500 or more wage earners were employed during the year.

The largest number of wage earners employed in the merchant mills during any month of 1909 was 41,898, in November, and the smallest number, 36,911, in June, the minimum number forming 88.1 per cent of the maximum. The height of employment in the industry is naturally reached during the fall and winter months, when the grain from the year's crop becomes available for grinding. The industry, however, is not subject to any great changes from season

to season, as elevator service for the storage of grain is now so perfected as to keep the mills employed constantly. A comparison of the statistics for 1909 with those for 1904 shows very little change in the numbers employed each month. In 1904, however, the maximum number, 41,508, was reported for October, and the minimum number, 36,804, forming 88.7 per cent of the maximum, for June.

Table 8

WAGE EARNERS EMPLOYED IN MERCHANT FLOUR MILLS AND GRISTMILLS: 1909¹

STATE.	Average number during the year.	WAGE EARNERS EMPLOYED IN MERCHANT FLOUR MILLS AND GRISTMILLS: 1909 ¹											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	39,453	39,120	39,281	39,154	37,776	37,466	36,911	38,021	39,829	40,887	41,702	41,898	41,800
California.....	948	940	904	928	<i>889</i>	903	913	940	944	956	953	1,069	1,040
Illinois.....	2,464	2,447	2,445	2,481	2,427	2,420	<i>2,272</i>	2,410	2,557	2,540	2,533	2,506	2,526
Indiana.....	2,298	2,210	2,139	2,197	2,110	<i>2,057</i>	2,122	2,316	2,462	2,464	2,488	2,495	2,518
Iowa.....	647	640	627	632	615	613	<i>677</i>	578	611	687	717	738	733
Kansas.....	2,360	2,328	2,378	2,324	2,147	2,062	<i>2,024</i>	2,274	2,557	2,596	2,604	2,548	2,478
Kentucky.....	1,401	1,395	1,392	1,392	1,367	1,317	<i>1,281</i>	1,399	1,489	1,462	1,448	1,426	1,424
Maryland.....	506	510	503	491	490	496	496	500	500	500	521	527	541
Michigan.....	1,530	1,558	1,540	1,521	1,469	1,432	<i>1,407</i>	1,426	1,517	1,590	1,645	1,635	1,615
Minnesota.....	4,345	4,381	4,585	4,509	4,204	4,357	4,351	4,173	<i>3,990</i>	4,222	4,342	4,556	4,473
Missouri.....	2,198	2,151	2,200	2,153	2,075	2,065	<i>2,016</i>	2,212	2,371	2,330	2,280	2,270	2,255
Nebraska.....	839	813	824	829	817	785	748	701	841	889	929	936	956
New York.....	2,990	3,058	3,068	3,058	2,918	2,879	<i>2,820</i>	2,844	2,847	2,983	3,126	3,156	3,128
Ohio.....	2,585	2,535	2,509	2,470	2,449	2,434	<i>2,425</i>	2,443	2,677	2,776	2,783	2,771	2,748
Oklahoma.....	842	821	832	827	809	754	<i>741</i>	846	887	883	922	903	877
Pennsylvania.....	2,432	2,459	2,452	2,449	2,391	2,360	2,339	<i>2,305</i>	2,399	2,468	2,492	2,544	2,526
Tennessee.....	1,577	1,558	1,560	1,584	1,495	1,513	<i>1,425</i>	1,647	1,661	1,600	1,638	1,607	1,636
Texas.....	1,216	1,156	1,180	1,155	<i>1,145</i>	1,157	1,148	1,203	1,258	1,289	1,313	1,305	1,286
Virginia.....	1,014	995	999	1,001	992	979	983	994	1,020	1,035	1,062	1,045	1,059
Washington.....	644	639	620	598	558	550	<i>518</i>	537	572	782	815	797	737
Wisconsin.....	1,184	1,170	1,201	1,168	1,128	1,119	1,100	<i>1,062</i>	1,125	1,203	1,311	1,317	1,303

¹The month of maximum employment for each state is shown by boldface figures and that of minimum employment by italic figures.

Table 8 shows further that in the three foremost milling states—Minnesota, New York, and Kansas—the greatest activity occurred during the fall and winter. For Illinois, the fourth state in respect to value of products, however, the largest number of wage earners was reported for August. The months of maximum and minimum employment for 1909, and the number of wage earners reported for such months, are given for all the states in Table 24.

Prevailing hours of labor in merchant mills.—In Table 9 the wage earners in merchant mills have been classified according to the number of hours of labor per week prevailing in the establishments in which they are employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or less number of hours.

Nearly four-fifths (79.1 per cent) of the wage earners employed in the merchant mills in 1909 were in establishments where the prevailing number of hours was 60 or more per week. Only 10.1 per cent were employed in establishments where the prevailing hours were less than 54 per week. Of the seven groups shown in Table 9, by far the largest was that made up of the wage earners in establishments where the prevailing hours were 60 per week, which comprised 19,060 wage earners, or 48.3 per cent of the total number. This group was the most important, likewise, in all but three of the individual states for which figures are given. In Tennessee and in Texas, however, the wage

earners in establishments where the prevailing hours per week were 72 or over formed the largest group, and in Minnesota the greatest number (1,300, or 29.9 per cent of the total) were employed in establishments which reported 54 hours per week as the prevailing hours of labor. A number of establishments in this state, however, reported both 48 and 60 hours a week as the prevailing hours of labor. These figures no doubt represented the working hours of different departments of the establishments, and in such cases the employees were tabulated under what would be the mean time, namely, 54 hours per week. The figures for this group, therefore, may be somewhat high.

Table 9

AVERAGE NUMBER OF WAGE EARNERS IN MERCHANT FLOUR MILLS AND GRISTMILLS: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	39,453	3,395	591	2,602	1,675	19,060	4,860	7,470
California.....	948	117	71	77	53	371	255	4
Illinois.....	2,464	310	50	24	19	1,229	331	501
Indiana.....	2,298	114	13	43	18	1,149	343	618
Iowa.....	647	36	6	22	1	403	99	80
Kansas.....	2,360	131	32	17	6	1,131	282	761
Kentucky.....	1,401	245	189	8	30	470	142	317
Maryland.....	506	16	1	1	16	229	57	186
Michigan.....	1,530	115	33	11	10	1,219	85	57
Minnesota.....	4,345	353	3	1,300	907	1,207	343	232
Missouri.....	2,198	119	6	32	6	949	368	718
Nebraska.....	839	11	14	6	6	447	236	119
New York.....	2,990	79	12	539	57	1,839	119	345
Ohio.....	2,585	207	53	56	66	1,571	378	254
Oklahoma.....	842	98	10	11	4	280	168	271
Pennsylvania.....	2,432	273	49	147	211	1,088	377	287
Tennessee.....	1,577	167	5	3	.....	410	78	914
Texas.....	1,216	108	.....	2	.....	281	200	625
Virginia.....	1,014	53	12	18	13	510	71	307
Washington.....	644	45	.....	45	17	333	27	177
Wisconsin.....	1,184	248	5	4	2	837	76	12

Character of ownership of merchant mills.—Table 10 presents data with respect to the character of ownership of the merchant flour mills and gristmills.

CHARACTER OF OWNERSHIP.	MERCHANT FLOUR MILLS AND GRISTMILLS.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	11,891	10,051	\$883,584,405	\$713,033,885
Individual.....	5,908	4,773	149,987,044	133,027,165
Firm.....	3,491	3,533	144,831,484	149,522,028
Corporation.....	2,271	1,732	588,189,883	429,736,098
Other.....	21	13	575,994	748,104
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	50.5	47.5	17.0	18.7
Firm.....	29.9	35.2	16.4	21.0
Corporation.....	19.4	17.2	66.6	60.3
Other.....	0.2	0.1	0.1	0.1

The most important distinction shown is that between corporate and all other forms of ownership. In 1909, of the total number of merchant mills reported for the industry, 19.4 per cent were under corporate ownership, as compared with 17.2 per cent in 1904. While corporations thus controlled less than

one-fifth of the total number of establishments, the value of the products of these establishments represented 66.6 per cent of the total value of products for all merchant mills engaged in the industry in 1909, and 60.3 per cent in 1904. These figures show an appreciable increase during the five-year period in the relative importance, as measured by value of products, of establishments under corporate ownership.

Between 1904 and 1909 there was a pronounced decrease both in the relative number of establishments under firm ownership and in the proportion which they reported of the total value of products, while there was an increase in the relative number of establishments operated by individuals, but a decrease in their relative importance as measured by value of products. Of the 21 establishments operated under forms of ownership other than individual, firm, or corporate, the majority were controlled by cooperative associations.

Table 11 gives statistics for merchant mills, classified according to form of ownership, for each state for which more than 500 wage earners were reported at the census of 1909.

STATE.	MERCHANT FLOUR MILLS AND GRISTMILLS: 1909											
	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	5,908	3,491	2,292	9,053	7,488	22,912	\$149,987,044	\$144,831,484	\$588,765,877	\$22,851,424	\$21,604,618	\$71,551,884
California.....	33	21	71	109	51	788	2,471,416	951,061	21,765,656	275,969	114,929	2,905,284
Illinois.....	210	146	105	424	421	1,619	8,253,326	6,622,994	36,234,361	770,668	923,049	3,827,393
Indiana.....	249	189	125	523	516	1,259	6,850,135	7,721,994	25,969,293	1,185,924	1,274,456	3,079,235
Iowa.....	146	89	42	171	125	351	2,412,391	2,547,298	7,910,914	441,667	446,057	1,049,101
Kansas.....	226	138	137	392	390	1,578	8,252,272	10,002,932	50,221,206	1,152,047	1,355,501	5,530,029
Kentucky.....	192	183	65	373	456	572	4,472,560	6,626,657	11,265,733	823,637	1,217,938	1,659,132
Maryland.....	211	58	26	252	87	167	4,535,663	1,634,992	3,097,248	621,574	220,198	423,158
Michigan.....	250	178	92	454	348	728	10,277,037	7,736,584	16,847,182	1,664,004	1,357,486	2,479,902
Minnesota.....	127	72	123	392	246	3,707	10,384,644	7,455,180	121,296,305	1,306,468	803,916	12,808,428
Missouri.....	309	212	159	414	400	1,384	5,157,588	6,837,764	32,512,754	910,818	1,135,062	3,636,598
Nebraska.....	115	75	59	199	176	464	3,844,517	4,978,782	9,012,297	628,531	724,531	1,265,266
New York.....	591	271	121	771	468	1,751	12,859,782	8,929,954	48,012,542	1,929,975	1,312,740	6,089,262
Ohio.....	280	272	121	604	671	1,310	8,472,566	11,645,211	27,975,576	1,467,028	1,844,075	3,429,643
Oklahoma.....	106	91	98	105	141	596	1,387,666	2,460,548	15,296,361	236,456	387,211	2,027,913
Pennsylvania.....	1,034	358	58	1,254	686	492	19,789,007	12,723,446	12,270,105	3,156,422	1,984,217	1,471,791
Tennessee.....	203	187	64	359	361	857	5,493,218	5,870,094	17,706,707	891,518	987,156	1,905,479
Texas.....	81	59	98	144	180	892	2,585,772	4,972,248	24,926,592	312,743	613,308	2,901,920
Virginia.....	256	133	69	365	314	335	5,023,139	6,374,083	6,200,823	776,566	735,964	921,247
Washington.....	24	18	54	38	53	553	720,169	879,987	16,252,788	94,880	167,801	2,116,157
Wisconsin.....	143	104	75	180	341	663	4,094,813	7,997,670	19,574,951	570,230	1,108,328	2,950,648

NOTE.—The figures for corporations include those for the few comparatively unimportant establishments operated by cooperative associations or under other miscellaneous forms of ownership.

In 1909, of the total number of wage earners reported for merchant mills, 9,053, or 22.9 per cent, were employed in establishments under individual ownership; 7,488, or 19 per cent, in those under firm ownership; and 22,912, or 58.1 per cent, in those owned by corporations.

There was considerable variation in the relative importance of the establishments operated by individuals, firms, and corporations, respectively, in the different states. Thus in Minnesota, the principal

flour-producing state, establishments controlled by corporations constituted 38.2 per cent of the total number of establishments, gave employment to 85.3 per cent of the wage earners, and reported 87.2 per cent of the total value of products. In Pennsylvania, on the other hand, corporations controlled only 4 per cent of the establishments, and these establishments gave employment to only 20.2 per cent of the wage earners, and contributed only 27.4 per cent of the total value of products.

Merchant mills classified according to size.—Table 12 presents statistics for 1909 and 1904 for merchant flour mills and gristmills classified according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	MERCHANT FLOUR MILLS AND GRISTMILLS.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	11,691	10,051	\$883,584,405	\$713,033,385
Less than \$5,000.....	1,651	514	4,781,883	1,869,134
\$5,000 and less than \$20,000.....	4,333	4,166	50,280,039	48,748,520
\$20,000 and less than \$100,000.....	4,411	4,245	187,287,491	179,263,525
\$100,000 and less than \$1,000,000.....	1,158	1,039	322,187,333	280,199,762
\$1,000,000 and over.....	138	87	319,047,659	202,952,454
Percent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	14.1	5.1	0.5	0.3
\$5,000 and less than \$20,000.....	37.1	41.4	5.7	6.8
\$20,000 and less than \$100,000.....	37.7	42.2	21.2	25.1
\$100,000 and less than \$1,000,000.....	9.9	10.3	36.5	39.3
\$1,000,000 and over.....	1.2	0.9	36.1	28.5

Of the 11,691 merchant mills reported for 1909, 138, or 1.2 per cent, manufactured products valued at \$1,000,000 or over. In 1904 there were 87 establishments of this class out of a total of 10,051. While such establishments represented a comparatively small proportion of the total number at both censuses, they reported a considerable proportion of the total value of products—36.1 per cent in 1909 and 28.5 per cent in 1904.

On the other hand, the small establishments—that is, those manufacturing products valued at less than \$20,000—constituted more than one-half (51.2 per cent) of the total number of merchant mills in 1909, but the value of their products amounted to only 6.2 per cent of the total. The great bulk of the output of the merchant mills was turned out by establishments

having products valued at \$100,000 or over, such establishments reporting 72.6 per cent of the total value of products in 1909 and 67.8 per cent in 1904.

The average value of products per establishment increased from \$70,942 in 1904 to \$75,578 in 1909, and the average value added by manufacture, as computed from the figures in Table 3, from \$9,259 to \$9,923. The increases, however, are wholly due to the increase in prices during the five-year period, as the actual quantity of grain ground per establishment was considerably less in 1909 than in 1904. The average number of wage earners per establishment, likewise, shows a decrease from 3.9 in 1904 to 3.4 in 1909. Neither the decrease in the average number of wage earners per establishment, however, nor the decrease in the average quantity of grain ground, should be taken as indicating a general tendency toward smaller establishments; for, as already stated, the canvass of 1909 covered a very considerable number of small mills which, while doubtless in operation in 1904, were not reported for that year. The increase in the number of establishments reporting products valued at \$5,000 or less from 514 in 1904 to 1,651 in 1909—from 5.1 per cent of the total number to 14.1 per cent—indicates in a general way the extent to which the more thorough canvass of 1909 may be assumed to have affected the statistics.

In some respects, and especially from the standpoint of conditions under which persons engaged in manufacturing work, the best classification of establishments to bring out the feature of size is a classification according to the number of wage earners employed. Table 13 gives such a classification of the merchant flour mills and gristmills in each state for which more than 500 wage earners were reported at the census of 1909.

STATE.	MERCHANT FLOUR MILLS AND GRISTMILLS EMPLOYING IN 1909—																
	TOTAL.		No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number)		Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.....	11,691	89,453	1,848	8,591	18,156	998	9,887	189	5,957	50	3,369	12	1,642	1	482	3	1,980
California.....	125	948	6	78	174	28	283	11	333	2	158						
Illinois.....	461	2,464	70	297	634	68	684	22	718	6	428						
Indiana.....	663	2,298	42	438	976	70	567	10	310	3	187	2	228				
Iowa.....	277	647	55	199	330	19	173	4	144								
Kansas.....	501	2,360	97	293	641	87	1,005	21	612	3	202						
Kentucky.....	440	1,401	63	333	766	40	349	2	51	1	85	1	150				
Maryland.....	295	506	82	199	320	12	99	1	27	1	60						
Michigan.....	520	1,530	62	415	798	34	326	7	269	2	137						
Minnesota.....	322	4,345	22	223	491	48	610	18	522	7	469	3	395	1	482	2	1,476
Missouri.....	680	2,198	131	468	858	65	695	12	342	3	202	1	101				
Nebraska.....	249	839	52	160	342	35	307			1	60	1	130				
New York.....	983	2,990	156	762	1,255	47	448	13	399	3	190	1	194			1	504
Ohio.....	673	2,585	69	529	1,182	68	645	13	427	3	181	1	150				
Oklahoma.....	295	842	44	216	376	31	331	3	83	1	52						
Pennsylvania.....	1,450	2,432	359	1,033	1,709	63	470	4	168	1	85						
Tennessee.....	454	1,577	66	350	680	28	263	6	238	3	206	1	190				
Texas.....	238	1,216	29	154	309	41	421	13	421	1	65						
Virginia.....	458	1,014	74	352	624	29	254	2	68	1	68						
Washington.....	96	644	5	62	145	23	266	5	178	1	55						
Wisconsin.....	322	1,184	54	237	442	23	253	3	117	5	372						

Of the 11,691 merchant mills reported in 1909, 15.8 per cent employed no wage earners, 73.5 per cent employed from 1 to 5, and 8.5 per cent from 6 to 20. There were only 66 establishments that employed an average of more than 50 wage earners, and of these only 16 employed over 100.

Of the total number of wage earners reported, 66 per cent were reported by establishments employing from 1 to 20, 15.1 per cent by establishments employing from 21 to 50, and 18.9 per cent by establishments employing more than 50 wage earners.

Expenses of merchant mills.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation, and consequently can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 3 shows the total expenses in merchant mills in 1909 to have been \$827,522,349, divided as follows: Materials, \$767,576,479, or 92.8 per cent; wages, \$21,464,386, or 2.6 per cent; salaries, \$12,516,767, or 1.5 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$25,964,717, or 3.1 per cent. There are slight variations, of course in the proportions for the different classes of expenses in the several states, but the proportion for cost of materials is so large in this industry that little is left for the three remaining items. In the 20 states shown in Table 13 the proportion of the total expenses represented by the cost of materials ranged only from 91.3 per cent in Kentucky to 94.6 per cent in Virginia.

Engines and power.—The amount of power used in the flour-mill and gristmill industry was first reported at the census of 1869. Table 2, which gives data for the milling industry as a whole, including the custom mills, shows that the total horsepower used increased from 576,686 in 1869 to 1,126,347 in 1909. Table 14 shows, for the merchant mills, the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current) and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments.

The total primary power used in the merchant flour mills and gristmills increased from 670,719 horsepower in 1899 to 853,584 horsepower in 1909, or 27.3 per cent. In 1909, as in 1904 and 1899, the power of steam engines constituted more than one-half the

total primary power, but in spite of a considerable increase between 1899 and 1904 steam power formed a smaller proportion of the total in 1909 than in 1899—55.5 per cent, as compared with 60.8 per cent. Water power also, which formed in 1899 more than one-third of the total primary power (36.2 per cent) constituted in 1909 only 31 per cent of the total. There was a marked increase, on the other hand, in the relative importance of the power of gas engines and of electric motors operated by purchased current (rented electric power). The horsepower of gas engines increased from 14,623 in 1899 to 62,681 in 1909, and the amount of rented electric power from 4,206 horsepower in 1899 to 49,901 horsepower in 1909.

The number and horsepower of the electric motors used for distributing power by means of current generated in the establishment also show a very decided increase.

Table 14 MERCHANT FLOUR MILLS AND GRISTMILLS.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	18,080	15,207	20,757	853,584	775,318	670,719	100.0	100.0	100.0
Owned.....	16,589	14,818	20,757	800,383	758,755	665,524	93.8	97.9	99.2
Steam.....	6,758	6,539	9,055	473,363	473,689	407,475	55.5	61.1	60.8
Gas.....	2,540	1,006	665	62,681	26,326	14,623	7.3	3.4	2.2
Water wheels.....	7,185	7,261	11,037	259,138	258,111	242,821	30.4	33.3	36.2
Water motors.....	106	12	(¹)	4,993	241	(¹)	0.6	(²)	(¹)
Other.....	.....	.....	.....	208	388	605	(²)	0.1	0.1
Rented.....	1,491	389	(¹)	53,201	16,563	5,195	6.2	2.1	0.8
Electric.....	1,491	389	(¹)	49,901	15,584	4,206	5.8	2.0	0.6
Other.....	.....	.....	.....	3,300	979	989	0.4	0.1	0.1
Electric motors	2,028	621	34	67,066	20,308	5,571	100.0	100.0	100.0
Run by current generated by establishment.....	535	232	34	17,165	4,724	1,365	25.6	23.3	24.5
Run by rented power.....	1,491	389	(¹)	49,901	15,584	4,206	74.4	76.7	75.5

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 15 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the merchant mills in the 20 states for which statistics have been presented in previous tables.

The states which ranked highest with respect to the amount of power used were Minnesota, New York, Pennsylvania, Ohio, Kansas, and Missouri. The total horsepower reported for these states in 1909 was 383,802, or 45 per cent of the aggregate for all merchant mills in the United States. Steam was the most important power in all of the states shown separately except Maryland, New York, Pennsylvania, and Virginia, where water power was used to a greater extent than any other form of power. The largest amount

of steam power—54,129 horsepower—is shown for Minnesota, and the largest amount of water power—36,039 horsepower—for New York. By far the largest amount of electric power—10,916 horsepower, or

nearly one-sixth of the total for the United States—was reported for New York, and of the power generated by gas engines the greatest amount—9,055 horsepower—was reported for Pennsylvania.

Table 15

MERCHANT FLOUR MILLS AND GRISTMILLS: 1909

STATE.	Primary horsepower.		Electric horsepower.							Fuel used.							
			Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec. tric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States	11,691	853,584	800,333	473,363	62,681	264,131	203	49,901	3,300	67,066	17,165	67,458	1,880,702	3,347	202,748	424,386	3,037,008
California	125	11,545	8,201	7,098	414	689	.....	3,344	.....	3,502	158	55	471	.....	871	150,634	.....
Illinois	461	38,472	36,931	34,095	1,691	1,055	90	1,541	.....	1,945	404	1,670	109,864	580	1,789	1,753	20,387
Indiana	563	38,502	37,101	34,368	2,091	642	.....	1,401	.....	1,638	287	181	189,970	1,344	6,844	915	105,193
Iowa	277	18,832	17,742	11,407	899	5,436	.....	1,080	10	1,146	66	356	56,061	2	196	1,038	3,603
Kansas	501	46,218	44,703	32,100	5,197	7,402	4	1,365	150	2,886	1,321	5,655	121,324	9	333	101,832	918,260
Kentucky	440	24,773	24,471	18,715	1,331	4,425	.....	302	.....	503	201	45	87,285	390	14,995	1,640	15,780
Maryland	235	13,807	13,609	5,862	1,196	6,551	.....	198	.....	246	48	1,012	18,257	.....	4,859	804	871
Michigan	520	38,991	37,162	17,648	2,825	16,689	.....	1,829	.....	2,488	659	1,035	77,069	5	7,258	2,396	867
Minnesota	322	93,849	91,187	54,129	1,371	35,687	.....	2,662	.....	7,342	4,680	4,572	249,807	60	17,338	1,796	160
Missouri	680	43,175	42,504	36,864	2,172	3,468	.....	671	.....	903	232	326	137,614	98	41,428	27,191	21,999
Nebraska	249	19,907	19,508	10,580	1,501	7,427	.....	399	.....	474	75	741	61,036	.....	94	2,610	.....
New York	983	79,098	71,191	27,440	7,656	36,039	56	6,014	1,893	10,916	4,902	7,515	93,485	60	1,370	7,372	630,395
Ohio	673	52,250	51,518	34,991	6,832	9,695	.....	732	.....	1,573	841	388	169,236	.....	2,776	1,090	770,887
Oklahoma	295	16,400	15,197	12,536	2,581	80	.....	1,203	.....	1,229	26	406	47,077	.....	1,226	16,054	138,737
Pennsylvania	1,450	69,212	67,299	25,205	9,055	33,039	.....	1,808	105	2,040	232	34,760	63,485	214	1,722	3,539	125,595
Tennessee	454	27,176	26,155	17,933	340	7,882	.....	866	155	1,006	140	80	86,636	230	17,626	936	.....
Texas	238	20,765	19,842	16,016	2,358	1,468	.....	863	60	1,514	651	.....	65,625	.....	3,387	75,315	4,700
Virginia	458	21,454	19,786	5,648	1,078	13,052	8	1,656	12	1,876	220	4	19,744	.....	3,676	1,007	.....
Washington	96	11,773	5,931	3,260	160	2,511	.....	5,842	.....	5,887	45	2	4,601	.....	6,318	8,304	.....
Wisconsin	322	31,903	30,406	14,440	1,911	14,055	.....	1,262	235	1,540	278	3,057	46,354	7	14,389	1,947	1,224
All other states	2,289	135,482	119,939	53,028	10,022	56,839	50	14,863	680	16,362	1,499	5,599	175,701	348	54,253	16,213	278,350

Fuel consumed in merchant mills.—Closely related to the question of the kind of power employed is that of the fuel consumed in generating this power or otherwise used in the industry. Owing to the extensive use of water power in the milling industry, less fuel is consumed in generating power than would otherwise be required. Bituminous coal was the principal fuel

used in the merchant mills, 1,880,702 short tons being consumed during 1909. Natural gas and oil were also used to a considerable extent, the largest quantity of the former being reported for Kansas and of the latter for California. The largest quantity of anthracite coal—34,760 long tons, or more than one-half the total for the country—was reported for Pennsylvania.

SPECIAL STATISTICS OF MATERIALS AND PRODUCTS.

Summary for all mills.—The special schedule used in collecting the statistics for the flour-mill and grist-mill industry required a detailed statement of the quantity of the different kinds of grain ground, and of the quantity and value of the different products manufactured. Table 16 shows these statistics as obtained for all mills in 1909 and 1899, for merchant mills in 1909, 1904, and 1899, and for custom mills in 1909. In addition, the table presents separate figures for 1909 for the merchant mills engaged principally in the manufacture of products intended for human consumption and for those whose chief products were such as are usually fed to live stock.

The total quantity of grain ground during 1909, 872,950,743 bushels, represented an increase of 37,807,118 bushels, or 4.5 per cent, over the amount reported for 1899. The merchant mills devoted primarily to

the manufacture of products intended for human consumption used 84.3 per cent of the total quantity reported for 1909; those producing mainly feed for live stock, 8 per cent; and the mills engaged exclusively in custom grinding, 7.6 per cent. As the custom mills for the most part keep no record of the amount of grain ground, their reports as to this item are very largely estimates, based on the receipts for toll.

In addition to the grain used in the flour-mill and gristmill industry a large quantity of grain was used by establishments whose chief products were breakfast foods, which are classified in the general report on manufactures as "food preparations." There are no figures available to show the kinds and quantities of the grain used in this manufacture, but the value of breakfast foods included with "food preparations" approximated \$37,000,000 in 1909.

Table 16

	ALL MILLS.		MERCHANT MILLS: 1909		CUSTOM MILLS: 1909	MERCHANT MILLS.			
	1909	1899	Manufacturing chiefly for human consumption.	Manufacturing chiefly for live stock.		1909	1904	1899	
GRAIN GROUND.									
Total	bushels..	872,950,743	835,143,625	738,013,881	70,234,060	66,702,782	806,247,961	754,945,729	729,061,820
Wheat	bushels..	503,468,556	489,914,004	495,647,480	832,834	6,988,242	496,480,314	494,095,083	471,306,986
Corn	bushels..	244,547,967	241,029,249	166,839,974	42,442,263	35,266,730	209,281,237	178,217,321	180,573,078
Rye	bushels..	13,974,095	12,720,812	10,311,032	1,192,937	1,870,126	11,503,969	11,480,370	10,088,381
Buckwheat	bushels..	8,394,120	8,317,357	6,815,273	1,540,794	1,238,058	7,156,062	6,531,305	5,490,156
Barley	bushels..	30,639,401	12,289,036	16,807,811	7,701,959	6,129,631	24,509,770	18,628,552	10,067,348
Oats	bushels..	63,301,992	65,352,637	35,826,906	14,434,992	13,059,494	50,241,598	45,381,009	47,175,766
Other grains	bushels..	9,225,512	5,520,530	3,966,700	3,108,311	2,150,501	7,075,011	612,089	4,360,107
PRODUCTS.									
Total	value....	\$936,899,966	\$560,719,063	\$632,790,364	\$50,794,041	\$65,115,663	\$683,564,405	\$713,033,395	\$501,396,304
Wheat flour	barrels..	107,108,461	103,524,094	105,690,504	66,141	1,351,816	105,756,645	104,013,278	99,763,777
	value....	\$557,814,979	\$348,183,800	\$549,769,492	\$346,762	\$7,698,725	\$550,116,254	\$480,258,514	\$333,997,686
Corn meal and corn flour	barrels..	27,188,352	40,035,977	21,322,626	230,111	5,635,615	21,552,737	23,624,693	27,838,811
	value....	\$87,088,530	\$73,177,402	\$66,220,534	\$720,561	\$20,147,435	\$66,941,095	\$56,368,656	\$52,167,739
Rye flour	barrels..	1,591,726	1,739,374	1,516,657	15,482	59,587	1,532,139	1,503,100	1,443,339
	value....	\$6,644,659	\$4,916,001	\$6,317,631	\$65,907	\$261,121	\$6,383,536	\$5,892,108	\$4,145,565
Buckwheat flour	pounds..	200,959,917	213,562,952	167,136,437	8,945,454	24,878,026	176,081,891	175,354,062	143,190,724
	value....	\$5,384,616	\$5,065,185	\$4,418,793	\$244,768	\$721,055	\$4,663,581	\$4,379,359	\$3,190,152
Barley meal	pounds..	33,649,182	99,730,423	28,225,492	325,460	5,098,230	28,550,952	68,508,655	91,275,646
	value....	\$580,654	\$1,113,958	\$479,282	\$6,718	\$94,654	\$486,000	\$922,884	\$963,710
Hominy and grits	pounds..	837,333,466	305,725,866	815,464,832	12,522,870	9,345,764	827,987,702	756,861,398	291,726,145
	value....	\$12,689,962	\$2,723,443	\$12,351,540	\$177,953	\$180,469	\$12,509,493	\$8,455,420	\$2,667,084
Feed	tons....	6,001,357	5,030,656	3,416,470	1,715,899	868,988	5,132,369	3,456,786	3,993,080
	value....	\$164,734,722	\$81,347,132	\$92,299,133	\$48,242,782	\$24,192,807	\$140,541,915	\$76,096,127	\$63,011,421
Offal	tons....	4,175,173	3,279,918	4,104,042	.....	71,131	4,104,042	4,468,626	3,164,408
	value....	\$91,406,717	\$38,112,424	\$39,814,427	.....	\$1,592,290	\$89,814,427	\$76,105,532	\$36,679,196
All other products	value....	\$12,355,119	\$6,079,718	\$11,139,532	\$988,590	\$226,997	\$12,128,122	\$4,554,895	\$4,673,751

Wheat was the principal kind of grain used both in 1909 and in 1899; the amount ground in the later year was greater by 13,554,552 bushels, or 2.8 per cent, than the amount reported for the earlier year. The relative importance of wheat, however, decreased somewhat during the decade, the proportion which it formed of the total quantity of grain reported being 58.7 per cent in 1899 and 57.7 per cent in 1909. Of the wheat ground in 1909, 495,647,480 bushels, or 98.4 per cent, were used in those merchant mills which manufactured primarily products intended for human consumption, only two-tenths of 1 per cent being used in the merchant feed mills and 1.4 per cent in the custom mills.

Corn was the next grain in importance, the quantity used in 1909 being 244,547,967 bushels. This represents an increase of 3,518,718 bushels, or 1.5 per cent over the quantity reported for 1899. In 1909 corn formed 28 per cent of the total amount of grain used, as compared with 28.9 per cent in 1899. In the case of the custom mills, however, corn formed considerably over one-half of the grain ground in 1909.

Oats, barley, rye, and buckwheat, in the order named, ranked next in respect to the number of bushels reported. The quantity of oats ground in 1909 was less by 2,051,545 bushels, or 3.1 per cent, than in 1899, and formed 7.3 per cent of the total in the later year, as compared with 7.8 per cent in the earlier. The relative importance of barley increased decidedly during the decade, the proportion which it formed of the total quantity of grain used being 3.5 per cent in 1909, as compared with 1.5 per cent in 1899. Correspondence reveals the fact that many establishments, although they reported the quantities of the principal kinds of grain ground, could not report the quantities of those of lesser importance

and thus lumped them in one item as "other grains." It seems certain, therefore, that the figures shown for "other grains" include considerable quantities of some of the grains for which separate figures are presented, in addition to the few unimportant grains which are not mentioned in the table.

Of the total quantity of grain ground in merchant mills, wheat constituted 61.6 per cent in 1909 and 64.6 per cent in 1899; corn formed 26 per cent in 1909 and 24.8 per cent in 1899; and oats formed 6.2 per cent in 1909 and 6.5 per cent in 1899. There was an increase of 77,186,141 bushels, or 10.6 per cent, in the quantity of all kinds of grain ground in these mills in 1909 as compared with the quantity ground in 1899.

While the schedule called for the selling value or price of the product at the mill, it was not always possible to obtain this value, and in some instances the amount received at the place of delivery was reported. Likewise, even when the selling prices at the point of production were obtained, they were in some cases retail prices and in others wholesale prices. For these reasons no attempt has been made to compute from the reported total values the average value per barrel, pound, or ton for the different classes of products.

The total quantity of wheat flour reported for 1909, 107,108,461 barrels, represents an increase of 3,584,367 barrels, or 3.5 per cent, over the amount reported for 1899. On the basis of the total quantity of wheat and wheat flour reported, an average of 4.7 bushels of wheat was used to produce a barrel of flour both in 1909 and 1899. Exact figures, however, are not available, because it is impracticable to determine how much of the total quantity of wheat reported was used in the flour mills and gristmills in the manufacture of feed and of breakfast foods. The quantity of wheat

flour shown in Table 16 for 1909 includes 451,500 barrels of Graham flour, valued at \$2,182,491.

In the production of corn meal and corn flour, which at the census of 1899 were included under the general heading of "Corn meal," a decrease of 12,847,625 barrels is shown for the decade 1899-1909. It is doubtful, however, whether there was actually so large a decrease in this product as the figures indicate. Since corn meal may be used either for human consumption or as feed for live stock, there was no doubt more or less confusion among those who filled out the schedules as to whether it should be reported as an article of human consumption, in which case it would appear as

so many barrels of corn meal, or as feed for live stock, in which case it would appear as so many tons of feed. In the manufacture of hominy and grits there was a large increase. "Feed" includes, in general, all products which are manufactured primarily for use as feed for live stock, while "offal," as the term is used in the census statistics, consists chiefly of bran and middlings, the by-products of the manufacture of wheat flour.

Merchant mills, by states.—Table 17 shows for merchant mills, by states, the quantities of wheat and corn ground in 1909, 1904, and 1899, and also the quantities of other grains ground in 1909.

GRAIN GROUND IN MERCHANT FLOUR MILLS AND GRISTMILLS.

STATE.	WHEAT (BUSHELS).			CORN (BUSHELS).			OTHER GRAINS (BUSHELS): 1909				
	1909	1904	1899	1909	1904	1899	Rye.	Buckwheat.	Barley.	Oats.	All other.
United States	496,480,314	494,095,083	471,308,886	209,281,237	178,217,321	180,573,078	11,503,969	7,166,062	24,609,770	80,241,698	7,075,011
Alabama.....	78,326	138,420	462,845	2,783,224	2,258,428	1,977,325	.....	.....	3,200	139,806	.....
Arizona.....	385,183	358,747	316,683	8,550	5,816	17,604	.....	.....	791,193	.....	.....
Arkansas.....	1,134,890	1,867,689	2,594,857	4,723,726	2,400,269	1,310,308	.....	.....	.....	94,280	.....
California.....	8,866,748	11,825,938	12,744,275	804,009	825,432	915,958	35,482	4,607	11,911,950	1,553,060	471,288
Colorado.....	4,574,480	4,635,278	4,793,453	1,570,185	922,926	1,562,862	29,447	150	344,554	258,486	22,363
Connecticut.....	16,141	6,531	9,554	2,139,404	2,239,271	2,544,284	22,358	6,097	4,625	377,417	.....
Delaware.....	882,483	832,689	709,481	596,202	759,523	751,687	1,523	27,043	.....	10,117	.....
Florida.....	20	.....	.....	123,754	174,936	181,800	.....	.....	.....	25,533	.....
Georgia.....	2,088,586	3,186,908	2,646,456	5,135,892	5,138,934	3,792,211	314	.....	.....	43,000	19,200
Idaho.....	1,890,276	1,509,784	1,182,401	16,585	10,000	4,426	3,700	.....	310,628	119,639	2,000
Illinois.....	30,303,512	28,380,202	28,198,219	12,637,221	12,816,823	11,373,625	788,533	61,529	151,477	659,915	843,239
Indiana.....	22,905,586	25,156,032	28,765,523	13,388,248	11,177,094	12,882,582	95,204	48,707	18,100	847,036	201,060
Iowa.....	7,063,273	8,689,866	11,604,496	3,350,442	2,463,049	4,198,690	168,255	101,588	229,291	781,800	87,330
Kansas.....	49,676,585	36,197,651	23,328,314	10,584,717	8,790,875	11,187,422	29,315	13,785	27,806	48,630	24,564
Kentucky.....	13,575,601	12,611,709	12,080,158	4,971,835	4,219,724	4,478,660	21,760	2,000	2,433	108,575	200
Louisiana.....	104,000	.....	3,000	800,840	80,430	584,000	.....	.....	.....	168,000	.....
Maine.....	60,898	136,230	115,804	4,757,998	4,545,168	4,375,896	2,990	40,511	26,915	833,889	33,872
Maryland.....	5,429,008	5,110,510	6,744,692	1,997,086	1,898,891	2,184,949	113,786	101,243	34,724	131,479	3,580
Massachusetts.....	38,441	37,429	27,104	5,265,210	6,247,591	9,117,277	46,416	2,250	5,340	363,454	3,172
Michigan.....	16,738,707	19,092,087	19,197,782	8,580,049	6,256,432	6,407,395	888,497	819,203	473,414	6,752,446	40,571
Minnesota.....	104,042,999	110,046,339	102,597,834	3,440,937	2,646,411	3,452,826	1,464,114	49,937	2,174,267	4,949,190	261,722
Missouri.....	27,004,019	29,507,080	24,028,746	10,474,264	8,013,969	9,152,031	34,107	2,057	6,671	154,983	6,415
Montana.....	1,701,589	1,462,979	1,168,244	.....	3,117	6,301	5,737	.....	.....	8,645	1,000
Nebraska.....	10,741,279	8,658,038	8,404,370	5,198,794	4,643,455	3,149,536	159,682	11,426	35,885	819,893	41,787
Nevada.....	294,075	237,190	147,046	5,827	7,299	40	.....	.....	225,833	.....	.....
New Hampshire.....	400,548	382,785	311,827	2,921,923	2,807,347	3,172,036	11,351	8,886	15,705	436,438	.....
New Jersey.....	1,377,248	1,711,041	2,222,002	3,336,651	3,523,460	4,055,870	565,672	118,505	13,650	570,765	18,550
New Mexico.....	259,944	250,676	374,532	77,686	73,777	38,298	.....	.....	.....	450	.....
New York.....	30,073,407	26,036,133	23,160,955	21,593,807	19,747,956	17,843,753	1,654,581	2,752,764	955,008	11,192,468	2,123,358
North Carolina.....	3,715,264	3,453,799	2,900,736	2,749,135	2,966,052	2,679,432	16,491	2,580	3,000	41,365	20,870
North Dakota.....	8,821,071	5,844,493	4,667,032	94,809	4,300	151,584	5,700	.....	584,422	650,539	113,995
Ohio.....	27,271,412	27,610,184	33,753,826	11,326,991	10,443,366	10,640,919	215,374	257,098	52,971	3,329,675	1,062,464
Oklahoma ¹	10,074,282	9,111,710	5,542,309	8,329,148	3,472,037	1,867,368	824	200	30	308,518	9,900
Oregon.....	6,414,594	8,059,304	8,603,442	54,445	27,279	56,004	12,864	788	1,040,328	1,473,029	3,990
Pennsylvania.....	18,320,116	19,207,373	21,277,176	15,665,222	14,658,274	13,001,739	1,920,082	2,065,565	97,995	4,322,695	484,823
Rhode Island.....	170	1,970	3,452	1,108,956	1,590,601	2,526,591	4,202	.....	.....	78,090	.....
South Carolina.....	27,900	258,438	524,347	315,590	483,062	453,241	600	.....	.....	1,000	10,500
South Dakota.....	4,697,391	5,705,270	4,279,664	208,873	285,524	250,870	18,653	8,182	60,440	112,675	70,596
Tennessee.....	14,359,868	15,144,660	16,035,045	9,971,656	9,062,184	8,853,032	600	865	3,262	43,810	3,025
Texas.....	16,243,203	15,365,908	12,177,919	9,961,388	4,182,282	2,973,153	10,111	.....	10,000	392,320	343,463
Utah.....	2,258,841	2,251,616	2,324,135	47,883	35,286	55,958	3,866	.....	248,417	23,842	5,000
Vermont.....	1,565	15,920	25,657	4,211,911	4,118,390	4,188,932	3,374	17,484	89,673	931,119	52,825
Virginia.....	9,672,288	8,586,439	7,202,821	5,876,745	6,086,297	4,457,120	114,862	58,563	89,805	55,548	14,065
Washington.....	12,854,599	13,887,162	8,772,778	352,969	269,901	359,858	24,227	.....	2,343,852	1,703,429	1,596
West Virginia.....	3,086,082	3,039,288	2,940,951	3,292,377	2,791,879	1,658,156	33,536	195,377	2,626	672,796	2,505
Wisconsin.....	18,262,688	17,896,060	21,784,604	3,847,801	3,430,171	4,191,433	2,969,874	377,072	2,108,512	4,779,399	689,353
Wyoming.....	468,130	222,478	226,937	128,181	18,915	20,000	5,000	.....	5,725	92,677	320
All other states ²	222,000	367,000	323,602	452,095	543,118	1,467,936	900	.....	.....	100	.....

¹ Includes Indian Territory in 1904 and 1899.² Includes the District of Columbia and Mississippi.

OTHER PRODUCTS OF MERCHANT FLOUR MILLS AND GRISTMILLS: 1909.

Table 19 STATE.	RYE FLOUR.		BUCKWHEAT FLOUR.		BARLEY MEAL.		HOMINY AND GRITS.		FEED.		OFFAL.	
	Quantity (barrels).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (tons).	Value.	Quantity (tons).	Value.
United States.	1,532,139	\$6,383,538	176,081,891	\$4,683,561	28,550,952	\$486,000	827,987,702	\$12,509,493	5,132,389	\$140,541,815	4,104,042	\$89,814,427
Alabama.....							4,889,356	90,579	22,776	699,041	976	20,004
Arizona.....					8,892,033	150,570			14,550	507,506	3,586	105,159
Arkansas.....							2,498,700	41,024	84,129	2,376,401	10,132	223,180
California.....	9,214	45,145	133,328	4,514	60,000	2,034	736,669	20,937	336,431	10,462,069	79,643	2,056,372
Colorado.....	1,726	7,176			367,800	8,190			54,350	1,567,745	41,770	978,663
Connecticut.....	3,527	16,899	115,286	3,905			119,600	1,836	35,707	1,060,656	335	6,638
Delaware.....	69	231	672,675	19,272			1,671,225	30,286	12,222	356,455	3,722	93,806
Florida.....							19,502	380	1,348	53,735		
Georgia.....	66	365					1,800	54	10,761	305,864	16,509	397,168
Idaho.....	57	285			40,000	600	213,340	5,924	10,491	293,757	17,182	350,376
Illinois.....	116,925	539,732	1,802,689	54,842	110,400	1,660	221,177,853	3,224,171	259,543	6,256,207	216,309	4,510,073
Indiana.....	1,770	7,027	1,446,634	36,480	16,805	248	256,678,796	3,758,367	184,664	4,593,176	203,358	4,247,471
Iowa.....	20,906	95,019	2,870,980	97,510	222,540	4,672	16,416,130	232,936	98,945	2,583,029	46,014	1,002,552
Kansas.....	5,745	25,938	407,855	11,768	43,000	626	22,900,765	332,836	239,392	5,693,672	381,554	7,753,222
Kentucky.....	906	4,232	16,000	600	14,400	242	7,103,217	127,193	18,053	490,958	125,951	2,729,877
Louisiana.....							62,500	1,300	29,812	694,806	905	23,482
Maine.....	451	2,156	728,332	19,302	146,491	3,361			64,715	1,941,003	594	17,110
Maryland.....	5,296	23,304	2,558,744	69,279	9,600	178	2,289,617	38,966	40,344	1,139,253	41,460	1,035,007
Massachusetts.....	8,152	35,483	54,500	2,110	33,360	1,252	100,000	3,000	34,767	1,012,851	166	3,320
Michigan.....	61,963	266,698	20,161,026	547,024	33,600	499	38,610	1,098	354,591	10,203,552	166,219	3,766,934
Minnesota.....	229,651	936,066	990,387	33,047	432,900	5,496	14,234,660	210,022	258,078	6,357,996	822,755	16,754,817
Missouri.....	762	3,320	69,440	2,319			26,726,254	413,234	186,202	4,651,980	239,265	5,059,079
Montana.....	856	4,794						346	10,490	13,688	256,332	
Nebraska.....	26,475	120,425	281,389	10,842	180,000	3,000	34,670,724	501,357	97,159	2,353,508	91,903	1,798,390
Nevada.....									5,575	173,668	2,631	63,721
New Hampshire.....	3,138	12,576	69,356	1,491	122,970	1,727	700	28	37,467	1,080,959	4,012	100,270
New Jersey.....	51,308	207,448	2,910,530	77,835	13,200	254	180,000	3,000	93,491	2,747,299	14,792	349,452
New Mexico.....									2,079	65,987	2,263	62,015
New York.....	226,992	970,797	66,632,357	1,724,854	1,530,356	25,587	19,534,650	289,941	637,270	18,745,100	219,653	4,980,333
North Carolina.....	1,155	6,470	73,500	2,310			8,056,030	143,658	11,814	352,582	36,135	918,443
North Dakota.....	153	581					9,029,862	261,844	30,575	805,888	76,357	1,554,283
Ohio.....	33,215	146,786	7,436,813	180,267			80,855,375	1,247,605	269,532	7,263,751	232,769	5,142,619
Oklahoma.....	1,449	698							204,481	6,062,822	81,524	1,698,003
Oregon.....	1,299	5,502	8,651	376	1,095,604	17,963	15,000	390	53,460	1,545,894	50,802	1,142,201
Pennsylvania.....	154,679	628,999	50,760,006	1,289,949	196,800	2,776	52,105,637	796,433	458,007	13,296,931	191,629	4,774,378
Rhode Island.....	1,143	3,803							5,211	153,898		
South Carolina.....	135	716					1,687,000	31,157	5,000	12,800	277	6,400
South Dakota.....	2,579	12,022	219,675	7,199	361,000	7,500			9,849	245,786	44,272	839,022
Tennessee.....	5	20	21,300	1,020			26,720,930	441,371	64,150	1,657,194	127,843	3,189,436
Texas.....	1,551	9,069					198,000	3,520	280,168	7,325,154	120,122	3,104,771
Utah.....	365	2,038			4,397,600	86,348			5,544	144,350	21,740	444,161
Vermont.....	404	1,406	363,550	9,376	3,499,983	54,185			48,850	1,528,928	12	433
Virginia.....	3,204	12,839	1,449,417	35,080	338,770	5,657	4,042,200	70,027	24,417	688,098	84,725	2,037,334
Washington.....	5,500	27,500			517,700	9,413	4,000	100	87,375	2,425,940	102,045	2,362,733
West Virginia.....	609	2,354	4,496,790	120,061	26,640	568	301,200	5,772	74,385	2,262,265	27,148	669,477
Wisconsin.....	549,358	2,194,220	9,330,781	300,929	5,817,400	91,494	12,707,800	179,147	269,793	7,033,082	132,991	3,053,366
Wyoming.....	500	2,500							5,168	126,992	4,084	88,921
All other states ¹	180	900							3,830	120,827	2,220	33,623

¹ Includes the District of Columbia and Mississippi.

Classification of wheat flour mills according to output.—On account of the special interest attaching to the mills which produce wheat flour, the number of such mills in each of the leading flour-producing states is shown in Table 20, with a classification according to the number of barrels of wheat flour produced. In most of these mills wheat flour was the principal product, and in a considerable number the only product.

The number of mills producing wheat flour decreased from 7,685 in 1904 to 7,342 in 1909. Since in 1909 the total number of merchant mills was 11,691, it appears that a great many did not grind wheat; indeed of the 9,162 which made chiefly products intended for human consumption over 1,800 reported no wheat flour.

Increases in number are shown for only two of the five groups, those producing less than 1,000 barrels during the year and those with an output of more than 100,000 barrels.

In both 1909 and 1904 mills which produced from 1,000 to 5,000 barrels constituted nearly one-half of the wheat-flour mills, and the next largest group comprised those which produced from 5,000 to 20,000 barrels. In 1909, however, this class only slightly exceeded the number having an output of less than 1,000 barrels, which latter class shows an increase of 35.3 per cent from 1904 to 1909. The number of the largest mills, those with a product of 100,000 barrels or more, increased from 166 in 1904 to 193 in 1909.

Minnesota, the most important flour-producing state, shows a decrease of 68 in the number of wheat-flour mills, and a decrease is shown for each of the five classes of mills except those producing less than 1,000 barrels.

Decreases in the total number of mills which produced wheat flour took place also in New York, Ohio, and Missouri, which ranked third, fifth, and sixth, respectively, in the production of such flour in 1909, as

shown by Table 20, but the number increased slightly in Kansas and Illinois, which ranked second and fourth, respectively.

Kansas had the largest number of mills with an output of 100,000 barrels or more in 1909 (35), and shows a greater increase in the number of such mills between

1904 and 1909 than any other state. No mills of this size were reported at either census for Arkansas, Idaho, Montana, New Jersey, North Carolina, Utah, or West Virginia, and in only 11 of the states shown separately was there an increase in the number of such mills between 1904 and 1909.

STATE.	Census.	Total number of mills.	MERCHANT MILLS MANUFACTURING WHEAT FLOUR, GROUPED ACCORDING TO NUMBER OF BARRELS PRODUCED.					STATE.	Census.	Total number of mills.	MERCHANT MILLS MANUFACTURING WHEAT FLOUR, GROUPED ACCORDING TO NUMBER OF BARRELS PRODUCED.				
			Less than 1,000 barrels.	1,000 but less than 5,000 barrels.	5,000 but less than 20,000 barrels.	20,000 but less than 100,000 barrels.	100,000 barrels or more.				Less than 1,000 barrels.	1,000 but less than 5,000 barrels.	5,000 but less than 20,000 barrels.	20,000 but less than 100,000 barrels.	100,000 barrels or more.
United States...	1909	7,342	1,721	3,145	1,733	550	193	New York.....	1909	270	105	86	49	19	11
	1904	7,685	1,272	3,502	2,123	622	166		1904	304	112	92	64	22	14
Arkansas.....	1909	51	13	30	6	2	.....	North Carolina.....	1909	208	51	120	34	3	.....
	1904	81	4	54	21	2	.....		1904	213	48	126	37	2	.....
California.....	1909	66	12	22	19	9	4	North Dakota.....	1909	64	6	10	26	15	7
	1904	83	8	31	22	18	4		1904	55	1	12	26	13	3
Colorado.....	1909	48	9	13	14	10	2	Ohio.....	1909	593	66	296	188	33	10
	1904	48	5	12	17	13	1		1904	659	40	353	226	34	6
Georgia.....	1909	47	20	18	5	3	1	Oklahoma ¹	1909	92	15	16	34	22	5
	1904	69	22	35	5	6	1		1904	86	8	18	31	28	1
Idaho.....	1909	48	4	19	21	4	.....	Oregon.....	1909	104	9	46	38	8	3
	1904	28	.....	10	13	5	.....		1904	94	7	41	35	9	2
Illinois.....	1909	309	87	87	76	47	12	Pennsylvania.....	1909	917	332	427	141	14	3
	1904	302	48	106	89	47	12		1904	870	245	457	139	23	6
Indiana.....	1909	463	52	227	148	28	8	South Dakota.....	1909	86	10	31	33	11	1
	1904	507	56	213	199	32	7		1904	92	4	20	53	14	1
Iowa.....	1909	195	73	64	44	11	3	Tennessee.....	1909	353	79	181	78	10	5
	1904	234	58	98	62	13	3		1904	361	42	190	113	11	5
Kansas.....	1909	255	46	32	61	81	35	Texas.....	1909	102	18	20	33	22	9
	1904	248	19	55	75	78	21		1904	125	7	30	48	32	8
Kentucky.....	1909	353	50	188	99	14	2	Utah.....	1909	59	3	24	28	4	.....
	1904	358	53	189	99	14	3		1904	63	2	29	29	3	.....
Maryland.....	1909	235	79	114	37	3	2	Virginia.....	1909	348	103	181	47	13	4
	1904	182	39	98	39	5	1		1904	330	56	201	59	12	2
Michigan.....	1909	389	96	178	87	21	7	Washington.....	1909	65	5	14	16	24	6
	1904	367	50	173	110	27	7		1904	65	4	7	26	22	6
Minnesota.....	1909	270	22	96	87	33	32	West Virginia.....	1909	157	56	70	25	6	.....
	1904	338	20	110	130	44	34		1904	173	56	90	19	8	.....
Missouri.....	1909	499	111	237	105	32	14	Wisconsin.....	1909	218	69	95	34	14	6
	1904	525	66	282	125	42	10		1904	317	80	154	59	17	7
Montana.....	1909	12	.....	3	5	4	.....	All other states.....	1909	163	64	74	19	6	.....
	1904	12	.....	4	4	4	.....		1904	180	66	81	28	5	.....
Nebraska.....	1909	203	14	86	79	23	1								
	1904	222	19	89	97	16	1								
New Jersey.....	1909	100	42	40	17	1	.....							
	1904	94	27	42	24	1	.....							

¹ Includes Indian Territory in 1904.

Output of merchant mills producing 1,000 barrels or more of wheat flour in 1909.—Many mills, although classed as merchant mills because they buy grain and sell its products, serve purely local markets and have little commercial significance. In order to exclude these small mills, Table 21 has been limited to merchant mills producing 1,000 or more barrels of wheat flour in 1909. This table shows, by states, the quantity of wheat used, the number of barrels of flour manufactured, and its value.

The mills producing 1,000 barrels or more of wheat

flour reported 99.4 per cent of the total number of barrels of this product reported by merchant mills and 99.3 per cent of its value. Of the total production of wheat flour by the merchant mills in 1909 there remained, therefore, for the mills producing less than 1,000 barrels each a total of 661,839 barrels, valued at \$3,763,585. Minnesota reported 21.7 per cent of the total number of barrels of wheat flour produced by the mills reporting 1,000 or more barrels each and 20.9 per cent of the value.

MANUFACTURES.

Table 21

STATE.	MERCHANT FLOUR MILLS AND GRISTMILLS PRODUCING 1,000 BARRELS OR MORE OF WHEAT FLOUR: 1909				STATE.	MERCHANT FLOUR MILLS AND GRISTMILLS PRODUCING 1,000 BARRELS OR MORE OF WHEAT FLOUR: 1909			
	Number of estab- lish- ments.	Wheat used (bushels).	Wheat flour produced.			Number of estab- lish- ments.	Wheat used (bushels).	Wheat flour produced.	
			Quantity (barrels).	Value.				Quantity (barrels)	Value.
United States	5,621	491,224,288	105,094,806	\$546,352,969	California.....	54	8,709,682	1,800,349	\$10,346,764
Minnesota.....	248	104,251,138	22,771,362	114,426,758	Virginia.....	245	8,880,618	1,842,774	9,956,242
Kansas.....	209	49,607,646	10,879,028	52,545,343	North Dakota.....	58	8,805,002	1,823,146	9,019,624
New York.....	165	29,755,919	6,666,696	35,485,542	Iowa.....	122	6,933,594	1,505,009	7,861,486
Illinois.....	222	30,137,416	6,369,296	33,900,076	Oregon.....	95	6,385,346	1,357,393	5,900,094
Ohio.....	527	27,142,975	5,687,729	30,311,038	Maryland.....	156	5,230,551	1,091,390	5,887,770
Missouri.....	388	26,753,418	5,633,384	29,837,155	Colorado.....	39	4,539,520	975,067	5,156,809
Indiana.....	411	22,825,173	4,770,061	25,185,116	South Dakota.....	76	4,685,650	965,970	5,055,322
Pennsylvania.....	585	17,577,225	3,610,339	19,393,169	North Carolina.....	157	3,562,057	729,624	4,573,527
Texas.....	84	15,396,223	3,335,231	19,084,912	West Virginia.....	101	2,958,102	608,953	3,468,305
Michigan.....	293	16,621,230	3,393,296	18,540,105	Georgia.....	27	1,891,099	410,120	2,603,384
Wisconsin.....	149	16,096,485	3,458,815	17,746,544	Utah.....	56	2,255,091	458,498	2,350,911
Tennessee.....	274	14,185,775	2,965,687	17,005,538	Montana.....	12	1,701,589	375,440	1,860,681
Kentucky.....	303	13,454,022	2,808,618	15,778,600	Idaho.....	44	1,874,058	385,037	1,813,831
Washington.....	60	12,717,225	2,797,792	12,456,660	New Jersey.....	58	1,296,188	261,421	1,444,109
Nebraska.....	189	10,712,479	2,264,861	11,431,605	Arkansas.....	38	1,095,820	231,444	1,260,509
Oklahoma.....	77	10,017,098	2,199,995	10,932,512	All other states.....	99	3,168,874	650,981	3,752,628

Materials and products of feed mills.—Table 22 shows, for the merchant mills engaged principally in the manufacture of products commonly used as feed for live

stock, the quantity of the different kinds of grain ground, the quantity and value of the feed manufactured, and the value of all other products reported.

STATISTICS FOR MERCHANT MILLS MANUFACTURING CHIEFLY FEED FOR LIVE STOCK: 1909.

Table 22

STATE.	Number of estab- lish- ments.	GRAIN GROUND (BUSHEL).S.			Total value.	PRODUCTS.		All other products (value).
		Corn.	Oats.	Other grain.		Feed.		
						Quantity (tons).	Value.	
United States	2,529	42,442,263	14,414,992	13,376,825	\$50,794,041	1,715,899	\$48,242,782	\$2,551,259
Alabama.....	3	396,127	87,000	.....	404,028	12,386	402,534	1,494
Arkansas.....	3	451,042	35,280	.....	398,585	14,225	394,145	4,440
California.....	53	231,965	536,273	4,804,189	4,140,280	129,065	4,094,311	45,969
Colorado.....	31	435,896	135,068	.....	530,778	17,640	513,358	17,420
Connecticut.....	43	744,785	161,573	3,757	704,081	22,975	689,740	14,341
Idaho.....	10	10,500	41,625	120,153	116,349	3,878	116,014	335
Illinois.....	97	2,066,802	404,480	1,102,932	2,701,935	85,723	2,385,950	315,985
Indiana.....	49	320,013	112,950	16,972	358,879	10,727	301,486	67,393
Iowa.....	110	1,445,763	351,993	258,244	1,515,553	44,034	1,217,887	297,666
Kansas.....	266	5,239,875	44,830	58,357	3,720,623	139,926	3,405,430	315,193
Louisiana.....	5	141,830	10,000	.....	343,304	12,445	343,304	.....
Maine.....	64	1,387,418	269,824	11,982	1,282,784	43,303	1,276,173	6,611
Maryland.....	31	271,650	26,348	34,338	269,844	8,215	241,644	28,200
Massachusetts.....	8	351,858	30,268	13,400	312,435	9,146	263,590	48,845
Michigan.....	150	1,829,777	1,350,654	360,387	2,440,681	80,093	2,311,908	128,773
Minnesota.....	60	861,738	1,430,592	598,930	1,614,575	62,668	1,599,584	14,991
Mississippi.....	3	92,300	100	.....	89,580	2,538	89,580	.....
Missouri.....	78	3,373,528	136,934	60,702	2,654,186	102,824	2,438,427	215,759
Nebraska.....	41	755,786	188,743	37,063	646,537	25,861	631,230	15,307
New Hampshire.....	32	695,642	136,712	8,268	698,029	21,582	593,451	4,578
New Jersey.....	110	1,428,849	221,245	232,915	1,473,178	47,901	1,409,011	64,167
New Mexico.....	3	10,830	.....	450	16,600	308	10,200	5,400
New York.....	390	6,672,379	4,422,359	1,002,085	8,625,872	274,592	8,356,199	269,673
North Dakota.....	23	76,719	324,901	350,744	437,835	15,504	427,701	10,134
Ohio.....	49	629,935	301,457	985,386	1,417,057	46,626	1,333,262	83,795
Oklahoma.....	120	3,523,496	73,100	9,318	2,561,189	99,420	2,418,729	142,460
Oregon.....	11	43,452	564,817	304,471	542,071	17,790	540,451	1,620
Pennsylvania.....	452	4,650,794	1,090,269	878,801	5,127,869	165,041	4,903,938	223,931
South Dakota.....	11	43,784	29,300	62,728	76,401	2,880	73,782	2,619
Tennessee.....	13	901,836	40,135	9,806	705,113	26,769	705,113	.....
Texas.....	29	995,426	103,615	66,386	961,439	31,075	933,940	27,499
Vermont.....	26	858,026	122,565	60,825	802,681	26,946	779,119	23,562
Virginia.....	12	175,109	4,500	27,090	145,388	4,985	142,230	3,158
Washington.....	17	50,384	115,830	505,041	472,499	15,555	425,249	47,250
West Virginia.....	19	130,491	60,835	12,500	168,479	4,754	158,548	9,931
Wisconsin.....	100	1,162,825	1,402,607	1,213,126	2,282,878	82,505	2,186,598	96,280
All other states.....	7	73,633	46,310	48,856	135,446	3,994	128,966	6,480

GENERAL STATISTICS, BY STATES.

The principal data secured by the census inquiry concerning flour mills and gristmills, other than those relating to quantity and value of specific materials and products, are presented by states in Tables 23, 24, and 25.

Table 23 relates exclusively to merchant mills, and shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the industry,

primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 24 gives more detailed statistics for merchant mills for 1909.

Table 25 gives statistics for 1909 for the mills engaged exclusively in custom grinding.

MERCHANT FLOUR MILLS AND GRISTMILLS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	11,891	66,054	14,570	12,031	39,453	853,594	\$349,162	\$12,517	\$21,464	\$787,576	\$883,584	\$116,008
	1904	10,051	59,623	13,093	7,415	39,110	775,318	285,117	7,352	15,822	619,971	713,033	93,082
	1899	9,476			5,522	32,226	670,719	189,291	5,258	16,285	423,117	501,396	73,279
Alabama.....	1909	72	315	84	63	168	3,559	1,080	51	57	2,405	2,779	374
	1904	40	230	42	29	159	2,124	372	20	54	1,556	1,750	194
	1899	37			24	138		365	20	41	1,367	1,573	206
Arizona.....	1909	10	75	4	17	54	784	674	26	42	1,129	1,317	188
	1904	9	50		14	36	465	404	17	24	641	743	102
	1899	9			11	36	527	210	9	20	377	448	71
Arkansas.....	1909	113	549	133	104	312	5,946	1,599	97	122	4,859	5,615	756
	1904	91	434	116	55	263	4,430	1,353	45	104	3,157	3,702	545
	1899	79			33	277	3,985	828	21	94	2,249	2,758	509
California.....	1909	125	1,392	82	362	948	11,545	13,424	514	732	21,892	25,188	3,296
	1904	122	1,300	94	317	889	11,004	11,467	443	660	17,132	20,203	3,071
	1899	107			195	857	10,015	6,493	269	525	11,023	13,045	2,022
Colorado.....	1909	77	429	47	100	282	6,810	4,835	134	220	6,672	7,868	1,196
	1904	52	362	26	92	244	5,927	2,326	104	203	4,797	5,783	986
	1899	49			87	272	4,701	1,977	76	167	3,769	4,441	672
Connecticut.....	1909	98	288	122	21	145	3,616	1,276	22	72	1,731	2,024	293
	1904	86	311	98	46	167	3,108	1,336	39	86	1,691	1,952	291
	1899	84			32	170		1,042	23	76	1,399	1,700	301
Delaware.....	1909	65	244	86	19	139	3,349	672	14	57	1,500	1,752	252
	1904	47	214	65	12	137	2,827	484	8	58	1,315	1,537	222
	1899	45			18	120		926	17	46	902	1,070	168
District of Columbia.....	1909	7	50	7	5	38	556	503	7	16	432	506	74
	1904	7	77	11	5	61	462	193	8	30	568	660	92
	1899	8			18	84	606	197	13	31	535	629	94
Florida.....	1909	6	21	5	5	11	141	61	6	5	139	164	25
	1904	7	24	8	3	13	167	78	3	6	112	137	25
	1899	6			4	10		64	4	4	106	128	22
Georgia.....	1909	105	630	137	107	386	9,052	2,749	129	144	6,728	8,000	1,272
	1904	114	712	146	102	464	8,341	1,896	96	146	7,265	8,179	914
	1899	94			71	447		1,338	55	133	4,445	5,324	879
Idaho.....	1909	57	242	58	59	125	3,595	2,038	47	91	2,025	2,480	455
	1904	28	127	22	21	84	1,963	685	19	67	1,315	1,564	269
	1899	26			19	68		518	14	42	572	734	162
Illinois.....	1909	481	3,634	544	626	2,464	38,472	18,454	805	1,271	45,590	51,111	5,521
	1904	363	3,287	412	465	2,410	38,158	14,128	509	1,211	34,930	39,892	4,962
	1899	353			356	1,966	33,801	10,714	356	1,030	24,937	28,575	3,638
Indiana.....	1909	563	3,508	703	507	2,293	38,502	15,857	474	1,216	35,002	40,541	5,539
	1904	566	3,464	830	345	2,289	42,160	11,907	303	1,091	31,342	36,474	5,132
	1899	541			286	2,071	42,318	10,023	277	992	24,804	29,038	4,234
Iowa.....	1909	277	1,186	354	185	647	18,832	6,123	176	382	10,934	12,871	1,937
	1904	276	1,320	377	173	770	20,049	5,216	135	399	10,317	12,099	1,782
	1899	309			172	942	21,247	4,947	136	424	8,969	11,013	2,044
Kansas.....	1909	501	3,778	568	850	2,360	46,218	22,741	946	1,448	60,439	68,476	8,037
	1904	354	2,713	429	453	1,831	34,655	13,817	452	1,024	36,895	42,034	5,139
	1899	357			278	1,405	27,691	8,016	266	726	18,131	21,329	3,198
Kentucky.....	1909	440	2,426	647	378	1,401	24,773	9,010	378	591	18,664	22,365	3,701
	1904	388	2,244	617	254	1,373	23,256	7,342	193	515	15,099	18,008	2,909
	1899	341			168	1,050	18,761	4,389	125	462	10,797	13,017	2,220
Louisiana.....	1909	11	112	5	25	82	895	594	34	33	840	943	103
	1904	3	9	4	1	4	140	50	1	2	53	66	13
	1899	4			2	30		70	2	9	253	289	36
Maine.....	1909	173	514	220	69	225	7,720	1,916	30	101	4,027	4,507	480
	1904	161	471	209	28	234	6,603	1,423	17	108	3,442	3,933	491
	1899	157			18	182		1,146	12	89	2,623	3,143	520
Maryland.....	1909	295	935	336	93	506	13,807	3,729	93	227	8,003	9,268	1,265
	1904	202	890	249	91	550	10,663	2,717	73	212	6,210	7,318	1,108
	1899	196			85	500	10,097	3,006	80	212	6,103	7,238	1,135

MERCHANT FLOUR MILLS AND GRISTMILLS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Contd.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Utah.....	1909	60	282	41	57	184	3,312	\$2,042	\$50	\$131	\$2,511	\$3,131	\$620
	1904	63	278	80	48	160	3,047	1,212	27	91	2,043	2,426	383
	1899	65	.....	.....	47	149	3,240	979	31	75	1,291	1,659	368
Vermont.....	1909	133	350	161	33	156	8,714	1,552	24	76	3,528	4,133	605
	1904	109	338	139	14	185	7,043	1,320	11	92	2,873	3,206	333
	1899	115	.....	.....	28	170	.....	1,104	20	73	2,287	2,770	483
Virginia.....	1909	458	1,817	571	232	1,014	21,454	8,700	198	399	15,164	17,598	2,434
	1904	365	1,597	498	142	957	16,082	5,503	105	349	12,171	13,832	1,681
	1899	359	.....	.....	100	613	14,573	3,198	67	262	7,484	8,942	1,458
Washington.....	1909	96	973	61	268	644	11,773	11,077	372	464	15,474	17,853	2,379
	1904	76	840	56	171	613	8,516	6,491	212	410	12,771	14,684	1,883
	1899	66	.....	.....	107	482	5,190	2,527	123	279	5,649	6,774	1,125
West Virginia.....	1909	207	884	288	144	452	9,950	3,766	113	210	6,601	7,696	1,095
	1904	194	780	301	79	400	8,339	2,623	66	183	5,213	6,200	987
	1899	165	.....	.....	22	254	7,356	1,429	14	125	3,109	3,793	684
Wisconsin.....	1909	322	1,931	386	361	1,184	31,903	10,663	371	695	27,038	31,667	4,629
	1904	389	2,096	511	234	1,351	42,211	10,546	253	720	24,756	28,352	3,596
	1899	358	.....	.....	220	1,275	36,735	8,419	246	650	20,623	23,701	3,078
Wyoming.....	1909	13	45	7	9	29	885	440	11	21	583	746	163
	1904	11	31	9	6	16	691	222	5	12	219	284	65
	1899	8	.....	.....	8	14	.....	157	10	11	155	211	56

Table 24		PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.	
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Average number.	Wage earners.				Total.	16 and over.		Under 16.			
					Male.	Female.		Number, 15th day of—					Male.	Female.	Male.	Female.		
								Maximum month.	Minimum month.	Maximum month.	Minimum month.							
1	United States.....	11,691	66,054	14,570	4,193	6,284	1,554	39,453	No	41,898	Je	36,911	42,495	41,787	565	136	7	853,584
2	Alabama.....	72	315	84	26	32	5	168	Au ¹	183	Ja	159	193	192		1		3,559
3	Arizona.....	10	75	4	9	7	1	54	Au	62	My ¹	50	53	53				784
4	Arkansas.....	113	549	133	41	49	14	312	Mh	346	De	261	342	338	1	3		5,946
5	California.....	125	1,392	82	125	203	34	948	No	1,069	Ap	889	1,087	1,064	23			11,545
6	Colorado.....	77	429	47	41	58	1	282	Oc	320	Jy	253	289	288		1		6,810
7	Connecticut.....	98	288	122	11	6	4	145	De ¹	153	Je ¹	140	155	152	2	1		3,616
8	Delaware.....	65	244	86	8	9	2	139	Oc	142	Ja ¹	136	143	142		1		3,349
9	District of Columbia.....	7	50	7	4	4		38	Oc ¹	44	Ja	33	44	44				556
10	Florida.....	6	21	5	3	2		11	No ¹	12	My ¹	11	12	12				141
11	Georgia.....	105	630	137	47	54	6	386	Oc	443	Jy	358	409	403		6		9,052
12	Idaho.....	57	242	58	44	13	2	125	No	156	Jy	91	173	173				3,595
13	Illinois.....	461	3,634	544	253	285	88	2,464	Au	2,567	Je	2,272	2,627	2,608	17	2		38,472
14	Indiana.....	563	3,508	703	225	192	90	2,298	De	2,516	My	2,057	2,565	2,537	16	12		38,502
15	Iowa.....	277	1,186	354	86	77	22	647	No	736	Je	577	733	717	13	3		18,832
16	Kansas.....	501	3,778	568	305	461	84	2,360	Se	2,024	Je	2,024	2,522	2,477	24	21		46,218
17	Kentucky.....	440	2,426	647	122	214	42	1,401	Au	1,489	Je	1,281	1,455	1,431	24			24,773
18	Louisiana.....	11	112	5	8	16	1	82	De	95	Jy ¹	75	98	98				895
19	Maine.....	173	514	220	30	26	13	225	De	232	Je ¹	220	237	236	1			7,720
20	Maryland.....	295	935	336	42	45	6	506	De	541	Ap	490	542	537	1	4		13,807
21	Massachusetts.....	120	437	151	18	24	15	229	De	237	Au	223	243	240	3			5,642
22	Michigan.....	520	2,623	660	173	165	95	1,530	Oc	1,645	Je	1,407	1,630	1,610	15	5		38,991
23	Minnesota.....	322	6,890	466	352	1,400	327	4,345	Fe	4,585	Au	3,990	4,490	4,415	74	1		93,849
24	Mississippi.....	13	37	14	3	2		18	De ¹	19	Jy ¹	18	19	19				609
25	Missouri.....	680	3,602	810	281	264	49	2,198	Au	2,371	Je	2,016	2,303	2,256	9	8		43,175
26	Montana.....	12	152	2	17	20	8	105	De	120	Je	95	122	121	1			2,313
27	Nebraska.....	249	1,455	293	120	166	37	839	De	956	Jy	701	985	913	69	3		19,907
28	Nevada.....	8	39	7	4	3	1	24	Oc	34	Jy ¹	19	27	27				395
29	New Hampshire.....	105	288	149	7	13	3	116	De	121	Jy ¹	112	129	126				5,502
30	New Jersey.....	238	790	255	28	46	8	453	No ¹	471	Je	431	474	471		3		10,763
31	New Mexico.....	16	48	13	6	1		28	De	42	My	15	47	46			1	532
32	New York.....	983	5,120	1,191	232	559	148	2,990	No	3,156	Je	2,820	3,125	2,987	131	3	4	79,098
33	North Carolina.....	249	971	384	49	34	8	496	De	533	My	463	554	543	3	8		11,578
34	North Dakota.....	84	710	79	75	99	22	435	Oc	560	Au	365	561	560	1			8,907
35	Ohio.....	673	4,164	911	257	287	124	2,585	Oc	2,733	Je	2,425	2,773	2,661	112			52,250
36	Oklahoma.....	295	1,679	533	126	153	25	842	Oc	922	Je	741	936	934		2		16,400
37	Oregon.....	114	620	101	65	46	14	394	Se	469	Mh	349	471	470	1			11,541
38	Pennsylvania.....	1,450	4,696	1,896	133	159	76	2,432	No	2,544	Jy	2,305	2,544	2,532	3	9		69,212
39	Rhode Island.....	18	68	18	4	6	1	39	No ¹	44	Mh	36	42	42				1,046
40	South Carolina.....	10	44	9	8	3	1	23	Fe	26	Se	21	26	26				406
41	South Dakota.....	95	454	83	54	22	10	285	No	320	My	253	323	322		1		7,364
42	Tennessee.....	454	2,658	663	166	226	26	1,577	Au	1,661	Je	1,425	1,650	1,633	2	13	2	27,176
43	Texas.....	238	1,899	225	152	283	23	1,216	Oc	1,313	Ap	1,145	1,355	1,346	3	6		20,765
44	Utah.....	60	282	41	38	16	3	184	Oc	203	Ap	170	200	200				3,312
45	Vermont.....	133	850	161	17	11	5	156	Mh	166	Se	145	182	182				8,714
46	Virginia.....	458	1,817	571	130	76	26	1,014	Oc	1,062	My	979	1,068	1,053	1	14		21,454
47	Washington.....	96	973	61	89	163	16	644	Oc	815	Je	518	742	734	8			11,773
48	West Virginia.....	207	884	238	55	77	12	452	No	466	Ja	437	478	474	2	3		9,950
49	Wisconsin.....	322	1,931	386	98	208	55	1,184	No	1,317	Jy	1,062	1,286	1,279	5	2		31,903
50	Wyoming.....	13	45	7	6	2	1	29	No	32	Ap	26	30	30				885

¹ Same number reported for one or more other months.

CUSTOM FLOUR MILLS AND GRISTMILLS—STATISTICS BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	11,961	22,795	16,634	147	7,014	272,763	\$21,258,610	\$47,828	\$1,138,712	\$48,314,868	\$55,115,653	\$8,800,685
Alabama.....	964	1,887	1,363	3	581	18,395	894,078	836	57,527	1,967,022	2,326,136	359,114
Arizona.....	4	8	5	3	3	108	22,400	1,680	38,879	46,159	7,280	
Arkansas.....	769	1,831	1,086	19	726	18,523	696,441	1,790	37,994	1,435,982	1,709,189	273,207
California.....	12	28	9	4	15	518	65,411	1,570	10,093	503,559	572,597	69,038
Connecticut.....	59	80	61	19	1,982	132,577	.....	.....	5,737	178,750	220,775	42,025
Delaware.....	6	6	6	.....	.....	145	5,400	.....	.....	15,735	19,693	3,958
Florida.....	88	144	127	2	15	1,839	98,947	169	4,248	237,351	273,928	36,577
Georgia.....	677	1,354	877	8	469	13,774	1,212,407	3,183	76,848	2,233,693	2,617,845	384,152
Idaho.....	11	17	14	.....	.....	196	55,225	.....	.....	1,674	118,831	17,315
Illinois.....	157	311	206	4	101	5,577	628,452	1,909	40,387	2,062,502	2,340,542	278,040
Indiana.....	175	274	216	5	63	4,566	428,879	1,665	21,187	679,818	836,847	157,029
Iowa.....	174	260	216	2	42	6,043	546,774	580	17,634	1,094,869	1,351,291	256,422
Kansas.....	39	170	161	.....	.....	911	129,366	.....	.....	3,046	180,117	34,030
Kentucky.....	822	1,409	1,038	2	369	11,933	544,171	510	38,192	1,663,346	2,059,677	396,331
Louisiana.....	31	81	32	4	45	830	34,751	272	2,986	35,462	46,471	11,009
Maine.....	34	45	35	.....	.....	10	1,279	.....	3,993	197,687	248,593	50,906
Maryland.....	114	148	129	1	18	2,133	181,623	250	5,472	399,939	484,793	84,854
Massachusetts.....	15	26	16	.....	.....	10	584	.....	.....	2,333	99,381	13,871
Michigan.....	208	357	256	8	93	7,172	722,877	3,260	36,538	1,792,317	2,140,461	348,144
Minnesota.....	278	577	459	9	109	6,516	792,685	4,990	41,715	3,190,150	3,660,055	469,905
Mississippi.....	596	1,495	837	10	648	15,852	475,776	804	33,685	1,073,848	1,258,318	184,470
Missouri.....	412	730	547	7	176	7,268	860,960	1,435	31,727	1,155,245	1,461,474	306,229
Nebraska.....	32	107	97	.....	.....	10	714	.....	.....	5,130	174,291	31,560
New Hampshire.....	25	38	33	.....	.....	5	743	.....	.....	1,819	63,972	77,443
New Jersey.....	39	65	41	1	23	1,232	134,226	364	9,023	243,662	287,050	43,388
New Mexico.....	19	37	29	.....	.....	8	1,255	.....	.....	113,179	141,653	28,474
New York.....	403	628	462	4	162	14,078	1,278,100	2,691	66,413	2,745,335	3,246,948	501,613
North Carolina.....	861	1,547	1,207	7	333	18,444	1,535,027	2,623	94,445	3,245,191	3,935,922	690,731
North Dakota.....	58	79	60	2	17	1,270	168,192	880	7,880	730,458	824,782	94,324
Ohio.....	152	301	199	7	95	5,125	503,988	2,842	30,018	981,496	1,189,853	208,357
Oklahoma.....	147	323	182	4	137	4,123	180,518	426	12,480	369,149	465,348	96,199
Oregon.....	15	22	16	.....	.....	6	344	.....	.....	97,323	116,984	19,661
Pennsylvania.....	539	773	611	.....	.....	162	13,893	.....	.....	47,804	3,070,504	491,991
Rhode Island.....	16	16	10	.....	.....	463	27,865	.....	.....	35,866	45,666	9,800
South Carolina.....	378	808	441	4	363	7,272	488,198	1,340	35,705	1,153,398	1,326,931	173,533
South Dakota.....	3	2	2	.....	.....	62	15,000	.....	.....	28,620	35,314	6,694
Tennessee.....	1,068	1,938	1,403	2	533	16,587	967,643	780	58,188	2,210,809	2,648,200	437,391
Texas.....	412	969	561	4	404	14,341	449,944	784	28,378	745,361	924,427	179,066
Utah.....	19	37	20	5	12	709	180,730	2,220	8,286	192,268	247,360	55,092
Vermont.....	35	51	35	.....	.....	16	1,906	.....	.....	3,227	165,181	32,333
Virginia.....	1,261	2,396	1,525	9	862	20,716	2,439,564	4,370	138,821	3,824,256	4,683,631	859,375
Washington.....	21	35	25	.....	.....	9	410	.....	.....	4,855	266,590	29,463
West Virginia.....	437	737	579	.....	.....	158	7,763	.....	.....	28,135	1,495,457	291,867
Wisconsin.....	371	638	447	9	182	15,076	1,667,710	4,285	75,682	4,864,846	5,578,660	713,814
All other states.....	5	10	6	1	3	113	20,400	900	1,805	53,270	61,852	8,582

GLUCOSE AND STARCH

(427)

THE GLUCOSE AND STARCH INDUSTRY.

GENERAL STATISTICS.

Summary for the industry: 1909.—Table 1 presents a summary of the statistics for the glucose and starch industry as a whole for 1909. It distinguishes two classes of establishments: (1) Those engaged primarily in the manufacture of glucose from Indian corn or maize, and (2) those engaged primarily in the manufacture of starch from corn, wheat, potatoes, and roots. The statistics for the industry also include those for a few establishments engaged in "reprocessing" and in packing starch in convenient form for the retail trade, but the starch reported by such establishments as material is purchased from other establishments in the industry.

Prior to 1909 the census reports gave the statistics for the industry under two classifications, "glucose" and "starch," but as some of the establishments manufacture both products, separate statistics have no great significance. Therefore, in all tables of this report except Tables 1, 3, and 4, only combined totals for the two classes of establishments are presented.

Of the 118 establishments canvassed in 1909, 93.2 per cent were engaged primarily in the manufacture of starch, but the value of products of these establishments formed only 32.5 per cent of the total value of products reported for the combined industry. The 8 establishments engaged primarily in the manufacture of glucose formed only 6.8 per cent of the total number of establishments, but the value of their products represented 67.5 per cent of the total value of products for the industry.

The establishments in the industry as a whole in 1909 gave employment to an average of 5,827 persons, of whom 4,773 were wage earners, and paid \$4,079,722 in salaries and wages.

The cost of materials used in the industry as a whole in 1909 was \$36,898,771, or equal to more than three-fourths (75.6 per cent) of the total value of products, which was \$48,799,311, and the value added by manufacture (that is, the value of products less cost of materials) was \$11,900,540.

Comparison with earlier censuses.—Table 2 summarizes the statistics of the combined industry for each census from 1879 to 1909, inclusive.

When measured by value of products the glucose and starch industry shows an advance from census to census. Decreases in some cases are shown in other items, however, the causes for these not being in all instances apparent.

A striking feature of the industry, as indicated by the figures, lies in the fact that while the number of establishments was less in 1909 than in 1879 the value of products was more than four times as large, thus showing a greatly increased productive power for the average establishment.

	Total for the industry.	ESTABLISHMENTS ENGAGED PRIMARILY IN MANUFACTURING—	
		Glucose.	Starch.
Number of establishments.....	118	8	110
Persons engaged in the industry.....	5,827	3,454	2,373
Proprietors and firm members.....	86	6	80
Salaried employees.....	968	600	368
Wage earners (average number).....	4,773	2,848	1,925
Primary horsepower.....	28,257	16,923	11,334
Capital.....	\$38,866,419	\$21,446,328	\$17,420,091
Expenses.....	43,973,558	29,743,978	14,229,580
Services.....	4,079,722	2,594,912	1,484,810
Salaries.....	1,413,239	957,588	455,651
Wages.....	2,666,483	1,637,324	1,029,159
Materials.....	36,898,771	25,271,792	11,626,979
Miscellaneous.....	2,995,065	1,877,274	1,117,791
Value of products.....	48,799,311	32,930,918	15,868,393
Value added by manufacture (value of products less cost of materials).....	11,900,540	7,659,126	4,241,414

	GLUCOSE AND STARCH INDUSTRY.									
	Number or amount.					Per cent of increase. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	118	140	132	87	146	-10.6	-15.7	6.1	51.7	-40.4
Persons engaged in the industry.....	5,827	5,409	6,605	(²)	(²)	-11.8	7.7	-18.1	.....	.....
Proprietors and firm members.....	86	111	109	(²)	(²)	-21.1	-22.5	1.8	.....	.....
Salaried employees.....	968	619	553	(²)	(²)	75.0	56.4	11.9	.....	.....
Wage earners (average number).....	4,773	4,679	5,943	4,627	4,311	-19.7	2.0	-21.3	(³)	(³)
Primary horsepower.....	28,257	35,986	26,642	20,989	(²)	6.1	-21.5	35.1	26.9	.....
Capital.....	\$38,866,419	\$24,053,008	\$52,682,812	\$10,920,178	\$7,583,256	-26.2	61.6	-54.3	382.4	44.0
Expenses.....	43,973,558	30,394,118	26,512,229	14,377,795	(²)	65.9	44.7	14.6	84.4	.....
Services.....	4,079,722	3,295,711	3,586,493	2,163,423	1,524,999	13.8	23.8	-8.1	65.8	41.9
Salaries.....	1,413,239	654,652	731,613	(²)	(²)	93.2	115.9	-10.5	.....	.....
Wages.....	2,666,483	2,641,059	2,854,875	(²)	(²)	-6.6	1.0	-7.5	.....	.....
Materials.....	36,898,771	25,518,876	21,579,655	10,182,808	7,955,510	71.0	44.6	18.3	111.9	28.0
Miscellaneous.....	2,995,065	1,579,531	1,346,081	2,031,564	(²)	122.5	89.6	17.3	-33.7	.....
Value of products.....	48,799,311	32,649,836	30,926,640	16,691,203	12,028,954	57.8	49.5	5.6	85.3	38.8
Value added by manufacture (value of products less cost of materials).....	11,900,540	7,130,960	9,346,985	6,508,395	4,073,444	27.3	66.9	-23.7	43.6	59.8

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available.
³ Figures not strictly comparable.

While a gain of 85.3 per cent in value of products is shown for the decade 1889-1899, in the succeeding five-year period (1899-1904) the gain was but 5.6 per cent. This lower rate of gain was probably due to a decreased foreign demand for American starch. The advance in value of products of the glucose and starch industry for the decade 1899-1909 was 57.8 per cent.

The industry was reported for 19 states at the census of 1909, but the statistics for only 3 states, Indiana, Maine, and Minnesota, can be shown without disclosing individual operations, and separate totals for these states are given in Table 16. As measured by the value of products, Illinois was the most important state in the industry, followed by Iowa, New Jersey, and Indiana, in the order named.

The most interesting feature brought out by the above table is the fact that in the five-year period 1904-1909 there was an increase of only 2 per cent in the number of wage earners employed in the industry. On the other hand, the value of products, as previously shown, increased 49.5 per cent in the five years. The wide discrepancy between the relative advance in value of products and in number of wage earners employed is doubtless indicative of improved processes used in the manufacturing of the products.

Table 3 presents briefly the statistics for each census from 1879 to 1909 for establishments engaged primarily in the production of glucose.

	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	8	2,848	\$1,637,324	\$25,271,792	\$32,930,918	\$7,659,126
1904.....	9	2,876	1,774,580	20,258,022	24,566,932	4,308,910
1899.....	8	3,288	1,755,179	15,773,233	21,693,656	5,920,423
1889.....	7	1,724	902,086	5,029,131	7,756,686	2,727,555
1879.....	7	1,192	605,802	3,044,450	4,551,212	1,506,762

Table 4 gives data for each census from 1849 to 1909 for establishments engaged primarily in the production of starch. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	110	1,925	\$1,029,159	\$11,626,979	\$15,868,393	\$4,241,414
1904.....	131	1,803	866,479	5,260,854	8,082,904	2,822,050
1899.....	124	2,655	1,099,696	5,806,422	9,232,984	3,426,562
1889.....	80	2,903	959,108	5,153,677	8,934,517	3,780,840
1879.....	139	3,119	919,197	4,911,060	7,477,742	2,566,682
1869.....	195	2,072	900,719	3,884,909	5,994,422	2,109,513
1859.....	167	1,073	298,526	1,380,000	2,823,258	1,443,258
1849.....	146	694	193,224	799,459	1,261,468	462,009

Persons engaged in the industry.—Table 5 shows for 1909 the number of persons engaged in the operation of glucose and starch factories, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY—BOTH BRANCHES COMBINED: 1909		
	Total.	Male.	Female.
All classes.....	5,827	5,319	508
Proprietors and officials.....	227	225	2
Proprietors and firm members.....	86	84	2
Salaried officers of corporations.....	49	49	.....
Superintendents and managers.....	92	92	.....
Clerks.....	827	700	127
Wage earners (average number).....	4,773	4,394	379
16 years of age and over.....	4,764	4,389	375
Under 16 years of age.....	9	5	4

The average number of persons engaged in the industry during 1909 was 5,827, of whom 4,773, or 81.9 per cent, were wage earners, 227, or 3.9 per cent, proprietors and officials, and 827, or 14.2 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 5,319, or 91.3 per cent, were males, and 508, or 8.7 per cent, females, of whom about three-fourths were employed as wage earners. Only nine children were employed as wage earners.

The average number of wage earners distributed by sex and age is not shown for the individual states, but Table 16 gives such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904 it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 6.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY—BOTH BRANCHES COMBINED.				Per cent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	5,827	100.0	5,409	100.0	7.7
Proprietors and firm members.....	86	1.5	111	2.1	-22.5
Salaried employees.....	968	16.6	619	11.4	56.4
Wage earners (average number).....	4,773	81.9	4,679	86.5	2.0

¹ A minus sign (-) denotes decrease.

Table 7 shows the average number of wage earners in the industry distributed according to age, and in

the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

CLASS.	WAGE EARNERS IN THE INDUSTRY—BOTH BRANCHES COMBINED.					
	1909		1904		1899	
	Num-ber.	Per cent distri-bution.	Num-ber.	Per cent distri-bution.	Num-ber.	Per cent distri-bution.
Total	4,773	100.0	4,878	100.0	5,943	100.0
16 years of age and over....	4,764	99.8	4,833	99.0	5,911	99.5
Male.....	4,389	91.9	4,339	92.7	5,354	90.1
Female.....	375	7.9	294	6.3	557	9.4
Under 16 years of age.....	9	0.2	46	1.0	32	0.5

Wage earners employed, by months.—Table 8 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909. The number of wage earners for the months of maximum and minimum employment are shown for Indiana, Maine, and Minnesota in Table 16.

MONTH.	WAGE EARNERS IN THE INDUSTRY—BOTH BRANCHES COMBINED: 1909	
	Number.	Per cent of maxi-mum.
January.....	4,731	85.0
February.....	4,827	86.7
March.....	4,954	89.0
April.....	4,624	83.0
May.....	4,578	82.2
June.....	4,686	82.3
July.....	4,245	78.2
August.....	4,198	75.4
September.....	4,812	85.4
October.....	5,569	100.0
November.....	5,398	96.9
December.....	4,771	85.7

The largest number, 5,569, was reported for October, and the smallest number, 4,198, for August, the minimum number being equal to 75.4 per cent of the maximum. In 1904 the maximum number, 5,815, was shown for October, and the minimum number, 3,981, for June, the latter number being equal to 68.5 per cent of the former.

Prevailing hours of labor.—In Table 9 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Nearly all the wage earners (98.1 per cent) reported for the industry as a whole were employed in establishments where the prevailing hours were 60 or more per week. The largest group was that made up of the wage earners in establishments where the prevailing hours were over 72 per week, such wage earners constituting 44 per cent of the total number.

PREVAILING HOURS OF LABOR PER WEEK.	WAGE EARNERS IN THE INDUSTRY—BOTH BRANCHES COMBINED: 1909	
	Average number.	Per cent of total.
Total	4,773	100.0
48 and under.....	70	1.5
Between 48 and 54.....	4	0.1
54.....	16	0.3
60.....	1,251	26.2
Between 60 and 72.....	672	14.1
72.....	658	13.8
Over 72.....	2,102	44.0

Character of ownership.—Table 10 presents statistics with respect to the character of ownership of the establishments engaged in the glucose and starch industry.

CHARACTER OF OWNERSHIP.	GLUCOSE AND STARCH INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	113	140	\$48,789,311	\$32,649,838
Individual.....	47	51	1,841,874	472,578
Firm.....	16	27	500,838	500,838
Corporation.....	55	57	46,957,437	31,604,292
Other.....		5		72,128
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	39.8	36.4	3.8	1.4
Firm.....	13.6	19.3		1.5
Corporation.....	46.6	40.7	96.2	96.8
Other.....		3.6		0.2

¹ Includes the group "firm," to avoid disclosure of individual operations.

In 1909, of the total number of establishments, 46.6 per cent were under corporate ownership, as compared with 40.7 per cent in 1904. In 1909 the value of products of these establishments represented 96.2 per cent of the total and in 1904, 96.8 per cent.

Size of establishments.—Table 11 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	GLUCOSE AND STARCH INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	113	140	\$48,789,311	\$32,649,838
Less than \$5,000.....	21	33	60,946	98,984
\$5,000 and less than \$20,000.....	60	66	665,195	669,260
\$20,000 and less than \$100,000.....	15	19	555,487	902,237
\$100,000 and less than \$1,000,000.....	9	14	4,074,354	30,979,355
\$1,000,000 and over.....	13	8	43,443,329	
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	17.8	23.6	0.1	0.3
\$5,000 and less than \$20,000.....	50.8	47.1	1.4	2.0
\$20,000 and less than \$100,000.....	12.7	13.8	1.1	2.8
\$100,000 and less than \$1,000,000.....	7.6	10.0	8.3	
\$1,000,000 and over.....	11.0	5.7	89.0	94.9

In 1909, 11 per cent of the establishments in the industry as a whole manufactured products valued at \$1,000,000 or over, such establishments returning 89 per cent of the total value of products. Comparable figures are not available for 1904. In 1909, however, 18.6 per cent of the establishments reported products

valued at \$100,000 or over, as compared with 15.7 per cent in 1904. The proportion of the total value of products for these establishments in 1909 and 1904 was 97.3 and 94.9 per cent, respectively.

The average value of products per establishment in the industry as a whole increased from \$233,213 in 1904 to \$413,553 in 1909, and the average value added by manufacture, as computed from the figures in Table 2, from \$50,935 to \$100,852. The average number of wage earners per establishment shows an increase from 33.4 in 1904 to 40.4 in 1909. In the glucose branch of the industry, as shown in Table 1, the average value of products per establishment in 1909 was \$4,116,365, the value added by manufacture \$957,391, and the average number of wage earners 356. In the starch branch of the industry the average value of products was \$144,258, the average value added by manufacture \$38,558, and the average number of wage earners 18.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 2 shows the total expenses in 1909 to have been \$43,973,558, distributed as follows: Cost of materials, \$36,898,771, or 83.9 per cent; wages, \$2,666,483, or 6.1 per cent; salaries, \$1,413,239, or 3.2 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$2,995,065, or 6.8 per cent. The unusually high proportion of the total expenses formed by cost of materials and the low proportion formed by wages is explained by the fact that the various processes in this industry are almost entirely mechanical.

Engines and power.—The amount of power used in the glucose and starch industry was first reported at the census of 1889. Table 2 shows that the total horsepower used increased from 20,989 in 1889 to

28,257 in 1909. Table 12 shows statistics of power, as reported at the censuses of 1909, 1904, and 1899.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	259	273	284	28,257	35,986	26,642	100.0	100.0	100.0
Owned.....	248	267	284	28,069	35,667	26,560	99.3	99.1	99.7
Steam.....	164	240	261	27,835	33,406	24,490	98.5	92.8	91.9
Gas.....	3	5	2	49	81	10	0.2	0.2	(²)
Water wheels.....	81	22	21	185	2,130	1,895	0.6	6.1	7.1
Other.....						165			0.6
Rented.....	11	6	(¹)	188	319	82	0.7	0.9	0.3
Electric.....	11	6	(¹)	163	169	63	0.6	0.5	0.2
Other.....				25	150	19	0.1	0.4	0.1
Electric motors	1,070	514	42	27,230	12,890	1,888	100.0	100.0	100.0
Run by current generated by establishment.....	1,059	508	42	27,067	12,721	1,825	99.4	98.7	96.7
Run by rented power.....	11	6	(¹)	163	169	63	0.6	1.3	3.3

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power used in the glucose and starch establishments decreased 7,729 horsepower, or 21.5 per cent, from 1904 to 1909, but increased 1,615 horsepower, or 6.1 per cent, from 1899 to 1909. In 1909, as in 1904 and 1899, the power of steam engines constituted more than nine-tenths of the total primary power. The horsepower of electric motors used for the distribution of power by means of current generated in the establishments in the industry increased from 1,825 in 1899 to 27,067 in 1909.

Fuel consumed.—Table 13 shows the amount of each kind of fuel consumed in the industry in 1909.

FUEL.	Unit.	Quantity.
Anthracite coal.....	Long tons.....	112,330
Bituminous coal.....	Short tons.....	637,693
Coke.....	Short tons.....	1,006
Wood.....	Cords.....	8,359
Oil, including gasoline.....	Barrels.....	30,418
Gas.....	1,000 feet.....	36

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

Materials.—Table 14 shows statistics of the materials used in the industry as a whole for 1909 and 1904.

Corn and potatoes are the most important materials used in the manufacture of glucose and starch. Computed on the basis of 56 pounds to the bushel, the 2,240,508,915 pounds of corn used in 1909 was equivalent to 40,009,088 bushels. Computed on the basis of 60 pounds to the bushel, the 210,608,127 pounds of potatoes used was equivalent to 3,510,135 bushels. Wheat flour is also an important material in the industry. The quantity and cost of arrow root and other

roots used as material are combined in Table 14 with that of wheat, the total for these materials in 1909 amounting to 1,940,000 pounds, valued at \$21,435.

A few establishments included in the industry, as before stated, are engaged primarily in "reprocessing" starch or repacking it in convenient packages for sale, and this results in a duplication of products, since the 105,299,010 pounds of cornstarch reported in 1909 as material by such establishments had already been reported as a product by establishments engaged primarily in its manufacture.

MATERIAL.	1909	1904
Total cost.....	\$36,898,771	\$25,518,876
Corn:		
Pounds.....	2,240,508,915	(¹)
Cost.....	\$26,674,779	\$19,074,728
Wheat and roots:		
Pounds.....	1,940,000	(²)
Cost.....	\$21,435	(²)
Potatoes:		
Pounds.....	210,608,127	209,372,549
Cost.....	\$541,359	\$563,651
Cornstarch:		
Pounds.....	105,299,010	(²)
Cost.....	\$1,763,173	(²)
Wheat flour:		
Pounds.....	19,545,824	(²)
Cost.....	\$482,263	(²)
All other materials.....	\$7,415,762	\$5,880,497

¹ Not reported.

² Not reported separately.

Products.—Table 15 shows the quantity and value of the several kinds of products manufactured in 1909 and 1904 by establishments in the glucose and starch industry as a whole.

PRODUCT.	1909	1904
Total value.....	\$48,799,311	\$32,649,838
Starch:		
Pounds.....	677,535,647	356,695,335
Value.....	\$17,514,823	\$10,927,538
Corn—		
Pounds.....	638,825,366	311,140,814
Value.....	\$15,962,916	\$3,873,450
Wheat and root—		
Pounds.....	13,836,866	17,845,121
Value.....	\$728,888	\$1,124,612
Potato—		
Pounds.....	24,873,415	27,709,400
Value.....	\$823,019	\$924,476
Glucose, including all sirups:		
Pounds.....	769,660,210	(¹)
Value.....	\$17,922,514	\$12,352,616
Grape sugar:		
Pounds.....	159,060,478	(¹)
Value.....	\$3,620,816	\$2,254,745
Corn oil:		
Gallons.....	8,164,175	(¹)
Value.....	\$2,802,768	\$1,164,466
Stock feed.....	\$6,013,968	\$4,446,479
All other products.....	\$924,422	\$1,503,992

¹ Not reported.

There was an absolute increase of \$16,149,475, or a relative increase of 49.5 per cent, from 1904 to 1909 in the total value of products for the industry as a whole.

Glucose (including glucose sirups) is the most important product shown in the table when measured by value. The value of this product as reported for 1909 was \$17,922,514, or 36.7 per cent of the total value of products for the industry. The increase in the value of glucose from 1904 to 1909 amounted to \$5,569,898,

or 45.1 per cent. Glucose was manufactured in only four states—Illinois, Indiana, Iowa, and New Jersey. Grape sugar, so called because it is found in ripe grapes rather than because it is produced from grapes, is the solid variety of glucose. It showed a relative increase in value from 1904 to 1909 of 60.6 per cent. Corn oil, a product obtained chiefly in the process of manufacturing glucose, increased in value \$1,638,302, or 140.7 per cent. The increase in the value of stock feed amounted to \$1,567,489, or 35.3 per cent. These products are chiefly reported by the glucose branch of the industry, though the establishments in this branch also produce considerable quantities of starch.

As shown by Table 15, 677,535,647 pounds of starch of all kinds, valued at \$17,514,823, were manufactured in the United States in 1909, as compared with 356,695,335 pounds, valued at \$10,927,538 produced in 1904. The production of cornstarch increased 327,684,552 pounds, or 105.3 per cent, in quantity, and \$7,084,466, or 79.8 per cent, in value, in the five-year period. This large increase was due entirely to increased domestic consumption. Starch made from wheat and roots decreased 4,008,255 pounds, or 22.5 per cent, in quantity, and \$395,724, or 35.2 per cent, in value, in the five years. Root starch was reported from Florida only. California, Connecticut, Massachusetts, Michigan, New Jersey, and New York reported starch made from wheat flour, and in each of these states, except California, cornstarch also was made. The quantity of potato starch decreased from 27,709,400 pounds in 1904 to 24,873,415 pounds in 1909, or 10.2 per cent, while the value decreased \$101,457, or 11 per cent. Potato starch was manufactured in 1909 in Colorado, Maine, Minnesota, and Wisconsin, but the principal point of activity was Aroostook County, Maine, where 61 factories were reported out of a total of 64 in the state. These factories reported the consumption of 171,283,746 pounds, or 81.3 per cent of the total of 210,608,127 pounds of potatoes used in the United States in the manufacture of starch, and the manufacture of 20,514,277 pounds, or 82.5 per cent of the total quantity of potato starch reported for the industry. Starch products are used for food, for laundering and sizing, for finishing calico, for thickening colors, and for many other purposes.

DETAILED STATE TABLE.

The principal statistics secured by the census inquiry concerning the glucose and starch industry are presented, by states, in Table 16, which gives detailed statistics for 1909 concerning the number of establish-

ments, number of persons engaged in the industry, wage earners on December 15, or the nearest representative day, primary horsepower, capital, expenses, value of products, and value added by manufacture.

MANUFACTURES.

GLUCOSE AND STARCH--DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.								WAGE EARNERS--DEC. 15, OR NEAREST REPRESENTATIVE DAY.						Primary horse-power.
		Total.	Pro-prietors and firm members.	Salaried officers, super-intend-ents, and man-agers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.			
					Male.	Fe-male.	Average number.	Number, 15th day of--			Male.	Fe-male.	Male.	Fe-male.		
								Maximum month.	Minimum month.							
United States	118	5,827	86	141	700	127	4,773	Oc 5,569	Au 4,198	5,559	5,112	437	6	4	28,257	
Indiana.....	4	944	6	22	39	11	866	Fe 966	Au 749	887	779	105	.....	3	3,070
Maine.....	64	195	65	10	.....	.....	120	Oc 623	Ja ¹ 0	636	618	18	.....	.....	1,838
Minnesota.....	13	33	.....	11	1	.....	21	Oc 111	Fe ¹ 0	131	131	.....	.....	.....	825
All other states ²	37	4,655	15	98	660	116	3,766	.....	.....	3,905	3,584	314	6	1	22,524

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manu-facture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, includ-ing internal revenue.	Contract work.	Other.		
United States	\$38,866,419	\$43,973,558	\$580,925	\$852,314	\$2,668,483	\$1,255,639	\$35,643,132	\$147,096	\$222,532	\$3,820	\$2,621,617	\$48,789,311	\$11,900,540
Indiana.....	4,264,995	5,562,414	67,797	63,088	479,621	192,361	4,489,259	.....	20,172	.....	250,116	5,749,976	1,068,356
Maine.....	890,387	567,450	2,330	.....	67,815	26,983	447,950	.....	4,723	820	16,829	686,606	211,673
Minnesota.....	222,783	124,318	1,401	500	11,492	5,320	94,410	.....	1,473	.....	9,722	121,373	21,643
All other states ²	33,488,254	37,719,376	489,397	788,726	2,107,555	1,030,975	30,611,513	147,096	196,164	3,000	2,344,950	42,241,356	10,593,868

¹ None reported for one or more other months.² All other states embrace: California, 1 establishment; Colorado, 1; Connecticut, 3; Florida, 2; Illinois, 5; Iowa, 5; Maryland, 1; Massachusetts, 4; Michigan, 1; Missouri, 1; Nebraska, 1; New Jersey, 2; New York, 5; Ohio, 2; Pennsylvania, 2; Wisconsin, 1.

MANUFACTURED ICE.

THE MANUFACTURED ICE INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—This industry includes all establishments engaged primarily in the manufacture of ice for sale, together with a few cold-storage houses making ice for sale in considerable quantities. For some establishments of the latter class the two branches of business were so closely interwoven that the receipts for storage had to be included in the value of products. For manufacturing plants in other indus-

tries making ice for sale, only the quantity and value of the ice was reported. For establishments such as breweries, cold-storage houses, and chemical factories, which manufacture ice solely for their own use, no statistics of any kind are included in this report.

Comparison with earlier censuses.—Table 1 summarizes the statistics of the industry for each census from 1869 to 1909, inclusive.

Table 1	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	2,004	1,320	775	222	35	4	158.6	51.8	70.3	249.1	534.3	775.0
Persons engaged in the industry.....	21,107	13,179	8,858	(²)	(²)	(²)	138.3	60.2	48.8	.....	.....	.....
Proprietors and firm members.....	1,066	746	447	(²)	(²)	(²)	138.5	42.9	66.9	.....	.....	.....
Salaried employees.....	3,927	2,332	1,531	(²)	(²)	(²)	156.5	68.4	52.3	.....	.....	.....
Wage earners (average number).....	16,114	10,101	6,880	2,826	447	97	134.2	59.5	46.8	(³)	(³)	(³)
Primary horsepower.....	317,789	191,660	100,421	20,264	(²)	72	216.5	65.8	90.9	395.6	.....	.....
Capital.....	\$118,641,538	\$66,592,001	\$38,019,507	\$9,846,468	\$1,251,200	\$434,000	212.1	78.2	75.2	286.1	687.0	188.3
Expenses.....	31,614,653	17,576,459	9,715,161	2,859,371	(²)	(²)	225.4	79.9	80.9	239.8	.....	.....
Services.....	13,646,881	7,550,273	4,629,076	1,441,187	140,885	40,600	194.8	80.7	63.1	221.2	923.0	247.0
Salaries.....	3,867,911	2,001,111	1,226,331	(²)	(²)	(²)	215.4	93.3	63.2	.....	.....	.....
Wages.....	9,778,970	5,549,162	3,402,745	(²)	(²)	(²)	187.4	76.2	63.1	.....	.....	.....
Materials.....	11,317,498	6,011,325	3,312,393	940,699	158,112	82,165	241.7	88.3	81.5	252.1	495.0	92.4
Miscellaneous.....	6,650,274	4,014,861	1,773,692	477,485	(²)	(²)	274.9	65.6	126.4	271.5	.....	.....
Value of products.....	42,953,055	23,790,045	13,780,978	4,900,983	544,763	258,250	211.7	80.6	72.6	181.2	799.7	110.9
Value added by manufacture (value of products less cost of materials).....	31,635,557	17,778,720	10,468,585	3,960,284	386,651	176,085	202.2	77.9	69.8	164.3	924.3	119.6
Ice manufactured (tons) ⁴	12,647,949	7,199,448	4,294,439	(²)	(²)	(²)	194.5	75.7	67.6	.....	.....	.....

¹ Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

⁴ In addition, in 1909, 1,582,259 tons of ice, valued at \$4,249,790, and in 1904, 814,689 tons, valued at \$1,899,912, were produced by establishments engaged primarily in the manufacture of products other than ice.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

While artificial ice was manufactured in the United States as early as 1866, the industry did not attain any considerable importance until the decade ending with 1889. The 4 ice manufacturing establishments reported for 1869 were all located in the Southern states, where the necessity for artificial ice was most urgent, and of the 35 establishments reported for 1879 all were in the South with the exception of 5 in California and 1 in Missouri. Since 1879, however, the industry has spread rapidly, and in 1909 establishments were reported from 41 states and the District of Columbia. During the 20 years from 1889 to 1909 the value of products increased \$38,052,072, or 776.4 per cent, the value added by manufacture, \$27,675,273, or 698.8 per cent, and the average number of wage earners, 13,288, or 470.2 per cent. The quantity of ice manufactured in 1909 was 12,647,949 tons, or almost three times the amount reported for 1899. The cost of materials in 1909 was equal to 26.3 per cent of the value of products, a much smaller proportion than in most other industries

Summary, by states.—Table 2 summarizes the more important statistics, by states, the states being arranged according to the value of products reported for 1909. No establishments in this industry were reported for 1909 from Maine, New Hampshire, Minnesota, North Dakota, South Dakota, Montana, or Wyoming.

Pennsylvania ranked first at the censuses of 1909 and 1904 in average number of wage earners, value of products, and value added by manufacture, the number of wage earners employed in the industry in the state increasing 72.7 per cent during the decade 1899-1909, and the value of products 136.5 per cent. Texas ranked second in 1909 in value of products and third in value added by manufacture, while New York ranked third in value of products and second in value added by manufacture.

Remarkable gains, especially in value of products, are shown by nearly all the states. The development for the decade 1899-1909 was most rapid in Oklahoma, the value of products for this state being more than eleven times as great in 1909 as in 1899. Kansas, Washington, California, and West Virginia also show very high percentages of increase.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹									
		Average number: 1909		Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.			
		1909	1904								1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909
United States.	2,004	16,114	100.0		\$42,853,055	100.0		\$31,635,557	100.0		134.2	59.5	46.8	211.7	80.6	72.6	202.2	77.9	69.8	
Pennsylvania.....	170	1,606	10.0	1	4,822,884	11.2	1	3,597,624	11.4	1	72.7	29.9	32.9	136.5	64.3	44.0	118.6	61.7	35.1	
Texas.....	182	1,437	8.9	2	3,844,120	8.9	2	2,752,277	8.7	3	132.5	65.4	40.6	224.7	84.5	76.0	218.5	82.1	74.9	
New York.....	89	1,124	7.0	3	3,808,070	8.9	3	2,763,802	8.7	2	252.4	86.4	89.0	262.3	117.7	66.4	253.3	135.8	49.9	
California.....	77	666	4.1	8	2,331,302	5.4	4	1,767,660	5.6	4	250.5	60.5	118.4	356.2	78.3	155.8	351.9	75.3	157.8	
Ohio.....	97	892	5.5	4	2,270,112	5.3	5	1,705,728	5.4	5	198.3	71.5	73.9	289.4	86.5	108.7	283.4	84.4	107.9	
Missouri.....	92	761	4.7	7	2,088,886	4.9	6	1,416,674	4.5	7	172.8	75.8	55.2	225.1	84.4	76.3	241.4	93.8	76.1	
Illinois.....	83	804	5.0	5	1,928,323	4.5	7	1,486,393	4.7	6	28.8	65.8	-22.3	94.6	105.1	-5.1	81.9	114.4	-15.2	
Louisiana.....	69	633	3.9	9	1,500,935	3.5	8	1,002,447	3.2	11	119.0	38.2	58.3	162.9	36.5	92.6	160.3	30.6	99.2	
New Jersey.....	59	456	2.8	16	1,496,555	3.5	9	1,110,479	3.5	9	149.2	70.1	46.4	281.9	131.0	65.3	291.2	133.4	67.6	
Kansas.....	89	593	3.7	10	1,459,842	3.4	10	1,118,104	3.5	8	420.2	150.2	107.9	644.9	149.6	198.5	698.6	151.8	217.1	
Tennessee.....	57	779	4.8	6	1,324,400	3.1	11	1,043,362	3.3	10	102.3	103.9	-0.8	146.1	93.6	27.1	143.7	85.9	31.1	
Indiana.....	85	563	3.5	11	1,310,566	3.0	12	984,750	3.1	12	64.1	44.0	14.0	141.0	75.3	37.5	132.9	67.8	38.8	
Oklahoma.....	77	449	2.8	17	1,272,515	3.0	13	965,459	3.1	13	20	127.9	.....	1,036.6	141.1	371.4	.....	137.3	.....
Florida.....	70	461	2.9	15	1,206,874	2.8	14	822,534	2.6	17	94.5	66.3	24.5	182.0	76.5	59.8	175.3	60.4	71.6	
Georgia.....	61	494	3.1	12	1,162,636	2.7	15	887,536	2.8	14	96.8	23.8	59.0	154.5	35.5	87.7	169.1	35.0	99.4	
Virginia.....	74	475	2.9	13	1,143,358	2.7	16	875,450	2.8	15	131.7	37.3	68.8	167.1	79.7	48.6	171.7	38.6	44.1	
Kentucky.....	78	472	2.9	14	1,134,590	2.6	17	827,735	2.6	16	11	145.8	36.8	79.7	150.0	61.4	54.8	122.6	46.8	51.6
Maryland.....	42	355	2.2	18	1,022,360	2.4	18	722,791	2.3	18	13	157.2	40.3	83.3	184.7	40.0	103.3	162.5	31.3	100.0
Mississippi.....	51	341	2.1	21	866,358	2.0	19	653,665	2.1	19	17	121.4	24.5	77.9	216.1	43.6	120.1	212.4	62.6	119.1
Arkansas.....	49	352	2.2	19	819,938	1.9	20	613,352	1.9	20	21	136.2	34.9	75.2	281.4	68.0	127.0	262.7	40.5	126.0
Alabama.....	45	343	2.1	20	776,645	1.8	21	575,507	1.8	21	114.4	41.2	51.9	221.1	46.1	119.8	201.6	40.5	114.7	
North Carolina.....	45	318	2.0	22	659,377	1.5	22	479,559	1.5	22	22	97.5	35.3	46.0	189.0	57.7	83.3	195.7	49.2	98.1
Colorado.....	30	251	1.6	23	569,839	1.3	23	443,734	1.4	23	23	.....	81.9	.....	51.6	84.3	158.6	45.6	76.3
Washington.....	25	163	1.0	26	557,711	1.3	24	416,583	1.3	24	25	.....	.....	436.5	129.6	133.7	.....	106.4	.....
Arizona.....	23	117	0.7	28	501,228	1.2	25	357,642	1.1	26	26	.....	.....	276.7	93.4	94.7	.....	77.6	.....
West Virginia.....	35	233	1.5	24	475,527	1.1	26	364,922	1.2	25	24	32.4	300.0	34.8	196.6	25.0
South Carolina.....	32	218	1.4	25	432,666	1.0	27	304,103	1.0	27	29	96.4	273.3	77.5	110.3	79.9
Dist. of Columbia.....	7	93	0.6	29	349,547	0.8	28	259,050	0.8	28	27	91.3	34.1	42.6	113.1	36.8	55.7
Iowa.....	18	151	0.9	27	289,642	0.7	29	225,692	0.7	29	34
Oregon.....	25	69	0.4	32	256,966	0.6	30	181,389	0.6	30	28	.....	.....	121.6	18.4	87.1	.....	2.8	.....
Massachusetts.....	7	55	0.4	34	202,915	0.5	31	135,784	0.4	32	38
Michigan.....	5	87	0.5	30	199,105	0.5	32	158,643	0.5	31
Connecticut.....	7	66	0.4	33	159,346	0.4	33	115,836	0.4	33	31	31.4
Delaware.....	15	71	0.4	31	153,138	0.4	34	103,655	0.3	34	30	7.7	-10.3
New Mexico.....	10	50	0.3	35	144,164	0.3	35	102,063	0.3	35	32
Nebraska.....	7	30	0.2	36	124,837	0.3	36	84,880	0.3	36	33
Utah.....	4	20	0.1	37	93,190	0.2	37	64,170	0.2	37	36
Idaho.....	4	19	0.1	38	64,828	0.2	38	53,186	0.2	38	39
Rhode Island.....	5	17	0.1	39	37,446	0.1	39	38,658	0.1	39	35
Nevada.....	3	14	0.1	40	39,117	0.1	40	26,976	0.1	40	37
All other states.....	4	16	0.1	36,107	0.1	25,403	0.1

¹ Percentages are based on figures in Table 2. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total	Male.	Female.
All classes.....	21,107	20,728	381
Proprietors and officials.....	3,405	3,333	72
Proprietors and firm members.....	1,066	1,007	59
Salaried officers of corporations.....	971	959	12
Superintendents and managers.....	1,368	1,367	1
Clerks.....	1,588	1,302	286
Wage earners (average number).....	16,114	16,091	23
16 years of age and over.....	15,995	16,972	23
Under 16 years of age.....	119	119	.....

Of the 21,107 persons engaged in the industry during 1909, 16,114, or 76.3 per cent, were wage earners; 3,405, or 16.1 per cent, were proprietors and officials; and 1,588, or 7.5 per cent, clerks, this class including other subordinate salaried employees. Of the total number of wage earners, only 23, or one-tenth of 1 per cent, were females, and only 119 (all males) were under 16 years of age.

The average number of wage earners in each state, for 1909, 1904, and 1899, is given in Table 20. The distribution of the average number by sex and age is not shown for the individual states, but Table 21 gives such a distribution for the number employed on December 15, or the nearest representative day, and also shows the month of maximum and minimum employment.

In order to compare the distribution of the persons engaged in the industry in 1909 with that in 1904 it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

Table 4

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				Percent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	21,107	100.0	13,178	100.0	60.2
Proprietors and firm members.....	1,066	6.0	749	5.7	42.9
Salaried employees.....	3,927	18.6	2,332	17.7	68.4
Wage earners (average number)...	16,114	76.3	10,101	76.6	59.5

Salaried employees show the greatest relative increase and constitute the only class forming a larger proportion of the total in 1909 than in 1904.

Table 5 shows the average number of wage earners in the industry, distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. The number of children

employed was so small that the increase from 1899 to 1909 has little significance.

Table 5

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.
Total.....	16,114	100.0	10,101	100.0	8,880	100.0
16 years of age and over..	15,985	99.3	10,047	99.5	8,846	99.5
Male.....	15,972	99.1	10,029	99.3	8,838	99.4
Female.....	23	0.1	18	0.2	8	0.1
Under 16 years of age....	119	0.7	54	0.5	34	0.5

Wage earners employed, by months.—Table 6 gives the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 for the 11 states in which an average of 500 or more wage earners were employed during the year.

Table 6

STATE.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909 ¹												
	Average number during the year.	Janu-ary.	Febru-ary.	March.	April.	May.	June.	July.	August.	Sep-tember.	Octo-ber.	Novem-ber.	Decem-ber.
United States	16,114	9,847	10,008	11,803	14,929	18,061	20,876	22,872	22,644	21,403	16,526	13,020	11,392
California.....	666	549	<i>524</i>	548	659	700	731	807	789	762	692	642	591
Illinois.....	804	<i>479</i>	484	632	733	877	1,035	1,123	1,134	1,078	852	678	551
Indiana.....	563	315	319	378	515	613	751	809	812	788	624	442	390
Kansas.....	593	<i>350</i>	358	435	502	638	790	907	926	835	591	422	362
Louisiana.....	633	473	<i>461</i>	532	609	704	765	827	825	808	629	491	478
Missouri.....	761	<i>401</i>	406	461	711	846	1,005	1,098	1,109	1,078	801	646	577
New York.....	1,124	<i>753</i>	756	888	1,007	1,141	1,324	1,485	1,450	1,407	1,261	1,079	939
Ohio.....	892	<i>595</i>	550	646	771	924	1,152	1,308	1,258	1,209	936	787	638
Pennsylvania.....	1,606	<i>1,044</i>	1,063	1,296	1,489	1,841	2,006	2,197	2,165	2,041	1,666	1,315	1,149
Tennessee.....	779	<i>440</i>	453	545	775	944	1,070	1,143	1,087	1,052	723	602	514
Texas.....	1,437	<i>808</i>	838	1,000	1,292	1,637	1,945	2,130	2,109	2,001	1,435	1,090	963

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the industry during any month of 1909 was 22,872, in July, and the smallest number, 9,847, in January, the minimum number being equal to 43.1 per cent of the maximum. In 1904, likewise, the maximum number was employed in July, and the minimum number, in January. This industry is naturally most active during the summer months, and the table shows a fairly uniform number of wage earners employed during the months of June, July, August, and September. The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for a larger number of states in Table 21.

Prevailing hours of labor.—In Table 7 the wage earners in the industry have been classified according to the prevailing number of hours of labor per week in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment has been classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Table 7

STATE.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909							
	Total.	In establishments with prevailing hours—						
		48 and under.	Be-tween 48 and 54.	54.	Be-tween 54 and 60.	60.	Be-tween 60 and 72.	72 and over.
United States	16,114	305	30	283	665	2,007	1,875	10,549
California.....	666	32	.....	28	102	256	131	117
Illinois.....	804	3	.....	2	242	84	139	334
Indiana.....	563	4	.....	.....	8	45	70	436
Kansas.....	593	10	.....	.....	1	65	140	377
Louisiana.....	633	.....	.....	.....	51	22	68	492
Missouri.....	761	13	.....	.....	14	147	37	550
New York.....	1,124	91	.....	76	65	107	225	580
Ohio.....	892	8	.....	.....	47	109	140	588
Pennsylvania.....	1,606	38	.....	69	19	229	138	1,113
Tennessee.....	779	2	.....	.....	.....	23	56	638
Texas.....	1,437	36	16	.....	46	121	97	1,121

The nature of the ice manufacturing industry is such that economical management calls for operation day and night, and practically all the larger plants are organized on the basis of two 12-hour shifts per day. More than nine-tenths (90.2 per cent) of the wage earners employed in this industry in 1909 were in establishments in which the prevailing hours were 60 or more per week, and 65.5 per cent in establishments in

which the prevailing hours were 72 or more per week. Less than 4 per cent of the total number of wage earners were reported as working 54 hours or less per week.

The proportion of wage earners reported as working 72 or more hours per week in the different states ranged from 17.6 per cent in California to 89.6 per cent in Tennessee, and that of wage earners working 60 or more hours per week, from 69.3 per cent in Illinois to 99.7 per cent in Tennessee. The wage earners working 72 or more hours per week constituted 78 per cent of the total in Texas, 77.7 per cent in Louisiana, 77.4 per cent in Indiana, 72.3 per cent in Missouri, 69.3 per cent in Pennsylvania, 65.9 per cent in Ohio, and 63.6 per cent in Kansas.

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of the establishments engaged in the industry in 1909 and 1904.

The most important distinction shown is that between corporate and all other forms of ownership. In 1909, of the total number of establishments reported for the industry, 69.2 per cent were under corporate ownership, as compared with 67.6 per cent in 1904. The value of products of these establishments repre-

sented a still greater proportion of the total for the industry, constituting 85.4 per cent of the total in 1909 and 81.5 per cent in 1904. All of the remaining forms of ownership decreased in relative importance during the period.

Table 8

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	2,004	1,320	\$42,953,055	\$23,790,045
Individual.....	330	230	3,495,344	2,498,549
Firm.....	284	1,198	2,743,245	1,912,489
Corporation.....	1,387	892	36,701,422	19,379,007
Other.....	3		13,044	
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	16.5	17.4	8.1	10.5
Firm.....	14.2	15.0	6.4	8.0
Corporation.....	69.2	67.6	85.4	81.5
Other.....	0.1		(²)	

¹ Includes two establishments under "other" ownership, to avoid disclosure of individual operations.

² Less than one-tenth of 1 per cent.

Table 9 gives statistics for establishments classified according to form of ownership in each state for which an average of more than 500 wage earners were reported at the census of 1909. The three establishments under "other" ownership have been combined in this table with those under corporate ownership.

Table 9

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	330	284	1,390	1,471	1,176	13,467	\$3,495,344	\$2,743,245	\$36,714,466	\$2,619,518	\$2,035,326	\$26,980,713
California.....	13	10	54	16	9	641	59,050	30,804	2,241,448	48,355	23,744	1,695,561
Illinois.....	11	6	66	56	34	714	138,740	66,726	1,722,857	113,225	52,841	1,320,327
Indiana.....	17	17	51	69	48	446	156,947	132,395	1,021,214	118,702	94,601	771,447
Kansas.....	12	15	59	37	62	494	96,460	129,238	1,234,144	73,930	97,027	947,147
Louisiana.....	13	2	54	72	(X)	561	<i>186,116</i>	(X)	1,344,869	<i>106,690</i>	(X)	895,757
Missouri.....	12	9	71	33	34	694	79,622	59,425	1,944,839	62,469	38,198	1,316,007
New York.....	13	8	68	104	76	944	246,660	168,861	3,392,549	196,495	127,548	2,439,759
Ohio.....	14	11	72	42	27	823	118,648	79,150	2,072,314	89,240	62,104	1,554,384
Pennsylvania.....	31	26	113	154	120	1,332	375,385	356,583	4,090,916	271,010	269,785	3,056,829
Tennessee.....	5	13	39	41	105	633	48,489	161,442	1,114,469	38,964	116,743	887,655
Texas.....	37	17	128	210	75	1,152	519,927	249,837	3,074,356	388,701	167,588	2,195,988

NOTE.—In Louisiana, in order to avoid disclosing the returns for individual establishments, the figures for firms have been consolidated with those for individuals. An (X) is placed in the column from which the figures have been omitted, and the figures for the group with which they have been combined are printed in italics.

In each of the states shown in Table 9 the number of establishments controlled by corporations greatly exceeded the number of those owned by individuals and firms combined, the number owned by corporations being over three times the combined number of the latter in four of the leading states. Of the total number of wage earners reported, 9.1 per cent were employed in establishments under individual ownership, 7.3 per cent in those under firm ownership, and 83.6 per cent in those owned by corporations. In value of products the establishments owned by corporations largely predominated in each of the states shown in Table 9, their proportion of the total ranging from 77.9 per cent in Indiana to 96.1 per cent in California.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for establishments in the industry grouped according to the value of their products.

Table 10

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	2,004	1,320	\$42,953,055	\$23,790,045
Less than \$5,000.....	403	256	1,204,299	809,207
\$5,000 and less than \$20,000.....	973	716	10,748,796	7,575,195
\$20,000 and less than \$100,000.....	587	327	23,741,981	12,095,210
\$100,000 and less than \$1,000,000..	41	21	7,257,979	3,310,433
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	20.1	19.4	2.8	3.4
\$5,000 and less than \$20,000.....	48.6	54.2	25.0	31.8
\$20,000 and less than \$100,000.....	29.3	24.8	55.3	50.8
\$100,000 and less than \$1,000,000..	2.0	1.6	16.9	13.9

More than half of the total value of products for the industry was reported at each census by establishments having products valued at from \$20,000 to \$100,000. This group and that composed of establishments reporting products valued at more than \$100,000 showed a gain in relative importance in 1909

as compared with 1904, whereas the relative importance of establishments with products valued at less than \$20,000 declined.

The average value of products per establishment increased from \$18,023 in 1904 to \$21,434 in 1909, and the average value added by manufacture, as calcu-

lated from Table 1, increased from \$13,469 to \$15,786, but the average number of wage earners per establishment increased only from 7.7 in 1904 to 8 in 1909.

Table 11 classifies the establishments in 11 of the leading states in the industry according to the number of wage earners employed.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—										
			No wage-earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.	
	Estab-lish-ments.	Wage earners (average number).	Estab-lish-ments.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.....	2,004	16,114	12	1,178	3,440	664	7,033	130	4,044	19	1,391	1	206
California.....	77	666	3	47	109	21	198	5	153				
Illinois.....	83	804		41	120	34	384	6	174	2	126	1	206
Indiana.....	85	563	1	53	157	26	254	5	152				
Kansas.....	86	593	2	56	178	24	277	4	138				
Louisiana.....	69	633		32	113	29	256	8	264				
Missouri.....	92	761		55	147	29	304	7	218	1	92		
New York.....	89	1,124		41	138	32	387	14	451	2	148		
Ohio.....	97	892		56	166	32	309	7	265	2	152		
Pennsylvania.....	170	1,606		87	243	65	725	16	491	2	147		
Tennessee.....	57	779		33	107	12	137	9	274	3	261		
Texas.....	182	1,437		104	314	63	652	15	471				

Of the 2,004 establishments engaged primarily in the manufacture of ice for sale in 1909, 12 reported no wage earners, 58.8 per cent reported from 1 to 5 wage earners, 33.1 per cent from 6 to 20, and 7.4 per cent from 21 to 100, while only 1 establishment employed more than 100 wage earners. Of the total number of wage earners, 21.3 per cent were reported by establishments employing from 1 to 5, 43.6 per cent by establishments employing from 6 to 20, and 35 per cent by those employing over 20.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses for the industry in 1909 to have been \$31,614,653, distributed as follows: Cost of materials, \$11,317,498, or 35.8 per cent; wages, \$9,778,970, or 30.9 per cent; salaries, \$3,867,911, or 12.2 per cent; and miscellaneous expenses, made up of ordinary repairs of buildings and machinery, insurance, traveling expenses, advertising, and other sundry expenses, \$6,650,274, or 21 per cent. For the states shown separately in Table 21 the proportion of the total expenses represented by salaries ranged from 2.6 per cent in Massachusetts to 28.6 per cent in Nebraska; the proportion for wages, from 20.6 per cent in Nebraska to 50.2 per cent in Michigan; that for materials, from 24.7 per cent in Idaho to 49.4 per cent in Delaware; and that for miscellaneous expenses, from 9.9 per cent in Delaware to 26.9 per cent in Maryland. The cost of fuel forms much the greater part of the cost of materials in this industry.

Engines and power.—Table 12 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	4,635	2,670	1,463	317,789	191,660	100,421	100.0	100.0	100.0
Owned.....	4,297	2,620	1,463	310,211	188,242	99,722	97.6	98.2	99.3
Steam.....	4,170	2,580	1,431	304,572	184,570	95,937	95.8	96.3	95.5
Gas.....	82	22	9	3,264	618	193	1.0	0.3	0.2
Water wheels.....	40	18	23	2,229	1,075	807	0.7	0.6	0.8
Water motors.....	5		(1)	33		(1)	(2)		
Other.....				113	1,979	2,785	(2)	1.0	2.8
Rented.....	338	50	(1)	7,578	3,418	699	2.4	1.8	0.7
Electric.....	338	50	(1)	5,414	1,068	389	1.7	0.6	0.4
Other.....				2,164	2,350	310	0.7	1.2	0.3
Electric motors.....	1,140	337	85	14,253	4,579	1,881	100.0	100.0	100.0
Run by current generated by establishment.....	802	287	85	8,839	3,511	1,492	62.0	76.7	79.3
Run by rented power.....	338	50	(1)	5,414	1,068	389	38.0	23.3	20.7

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary horsepower used in the industry increased from 100,421 in 1899 to 317,789 in 1909, or 216.5 per cent. In 1909, as in 1904 and 1899, steam power constituted more than 95 per cent of the total primary power.

The horsepower of gas and other internal-combustion engines and of electric motors run by purchased current (rented electric power) increased considerably during the decade and formed a larger proportion of the total primary power in 1909 than at the earlier censuses. The number and horse-

power of electric motors used for distributing power by means of current generated in the establishments in the industry also show a decided increase.

Table 13 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the ice plants of the 11 leading states.

STATE.	PRIMARY HORSEPOWER.									ELECTRIC HORSEPOWER.		FUEL USED.					
	Number of establishments reporting.	Total horsepower	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.					Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec.	Other.			Anthracite (long tons).	Bituminous (short tons).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	
United States...	1,980	317,789	310,211	304,572	3,264	2,282	113	5,414	2,184	14,253	8,839	244,396	2,430,454	8,872	183,984	905,952	4,348,929
California.....	76	9,971	8,923	8,621	110	192	.....	818	230	1,417	599	.....	.....	.....	797	380,724	.....
Illinois.....	83	13,283	13,208	13,008	200	.....	.....	55	25	664	609	1,786	198,077	.....	.....	20	14,803
Indiana.....	80	7,726	7,570	7,477	18	.....	75	56	100	261	205	1,630	127,317	.....	500	5	10,119
Kansas.....	85	14,636	14,410	14,298	112	.....	.....	81	145	434	353	4,721	57,443	125	.....	15,208	1,366,227
Louisiana.....	69	10,556	10,343	9,990	347	6	.....	148	65	388	240	8,850	72,509	.....	7,203	62,969	265,928
Missouri.....	92	22,904	22,450	22,446	4	.....	.....	98	356	1,382	1,284	.....	224,495	.....	1,487	60,373	280,374
New York.....	89	21,375	20,339	19,949	220	170	.....	1,036	.....	1,597	561	120,332	102,384	.....	.....	542	364
Ohio.....	97	19,058	18,986	18,701	285	.....	.....	72	.....	535	463	.....	186,012	5,246	.....	95	307,032
Pennsylvania.....	170	35,890	35,544	35,217	152	175	.....	250	96	1,259	1,009	39,995	300,192	.....	.....	62	505,782
Tennessee.....	56	9,327	9,251	9,241	10	.....	.....	76	.....	263	187	.....	99,165	.....	850	129	.....
Texas.....	180	29,905	29,807	28,631	1,034	142	.....	98	.....	1,021	923	6,781	191,604	.....	19,112	310,032	78,305
All other states.....	913	123,153	119,380	116,993	772	1,577	.....	2,626	1,147	5,032	2,406	54,301	871,256	1,501	154,035	85,793	1,520,195

Pennsylvania ranked first in 1909 in total primary power used, followed in order by Texas, Missouri, New York, and Ohio. The aggregate horsepower reported for this industry by these five states was 129,132, or 40.6 per cent of the total for the industry.

Fuel consumed.—The ice plants of New York led in

the consumption of anthracite coal; those of Pennsylvania, in that of bituminous coal; of Ohio, in that of coke; of California, in that of oil; and of Kansas, in that of gas. Expenditures for fuel and rent of power constituted 68.7 per cent of the cost of all materials in 1909.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND METHODS OF MANUFACTURE.

Materials.—Table 14 shows the quantity and cost of the ammonia used in the manufacture of ice in 1909, 1904, and 1899.

MATERIAL.	1909	1904	1899
Ammonia used, total cost.....	\$1,021,913	\$613,138	\$359,549
Anhydrous:			
Pounds.....	3,466,284	1,932,497	1,056,535
Cost.....	\$926,605	\$522,275	\$279,680
Aqua:			
Pounds.....	1,670,698	1,495,934	1,323,454
Cost.....	\$95,408	\$90,863	\$79,869

The cost of the ammonia used in the manufacture of ice for sale increased from \$359,549 in 1899 to \$1,021,913 in 1909, or 184.2 per cent for the decade. The average cost of ammonia per pound varied but slightly from census to census, that for anhydrous ammonia being 26.5 cents in 1899 and 26.7 cents in 1909 and that of aqua ammonia 6 cents in 1899 and 5.7 cents in 1909. The quantity of anhydrous ammonia used increased from 1,056,535 pounds in 1899 to 3,466,284 in 1909, or 228.1 per cent; and that of aqua ammonia increased from 1,323,454 pounds to 1,670,698 pounds, or 26.2 per cent, during the same time. In 1909 the cost of ammonia represented but 9 per cent of the total amount (\$11,317,498) expended for materials.

Products.—Table 15 shows the quantity and value of the ice manufactured, with separate figures for can ice and plate ice, and the value of all other products, for 1909, 1904, and 1899. Can ice is made in metal cans placed in tanks containing chilled brine, and plate ice in tanks having hollow partitions through which the refrigerating fluid runs, the water solidifying in plates on the outer surfaces of the partitions.

PRODUCT.	1909	1904	1899
Total value.....	1 \$42,853,055	1 \$23,780,045	2 \$13,874,513
Ice:			
Tons (2,000 pounds).....	12,647,949	7,199,448	4,294,439
Value.....	\$39,889,263	\$22,450,503	\$13,303,874
Can—			
Tons (2,000 pounds).....	11,671,547	6,695,789	4,139,784
Value.....	\$37,085,533	\$21,020,547	\$12,863,160
Plate—			
Tons (2,000 pounds).....	976,402	503,659	154,675
Value.....	\$2,803,730	\$1,429,956	\$440,714
All other products.....	\$3,063,792	\$1,330,542	\$570,639

¹ In addition, in 1909, 1,582,259 tons of ice, valued at \$4,249,790, and in 1904, 814,689 tons, valued at \$1,899,912, were produced by establishments engaged primarily in the manufacture of products other than ice.

² Includes, for purposes of comparison, products valued at \$93,535, for 12 establishments whose reports were received too late to be included in the general statistics for that year.

The total quantity of ice reported in 1909 by establishments in the industry was nearly three times as great as that reported for 1899—12,647,949 tons, as compared with 4,294,439 tons. From 1899 to 1909 can ice showed a gain of 181.9 per cent in quantity

and 188.3 per cent in value, and plate ice showed a gain of 531.3 per cent in quantity and 536.2 per cent in value. Plate ice, however, formed but a small proportion of the total quantity at either census—7.7 per cent in 1909 and 3.6 per cent in 1899.

Table 16 shows, by states, the number of establishments in the industry and the quantity of ice manufactured in 1909 and 1899, the states being arranged in the order of their production in 1909.

STATE.	NUMBER OF ESTABLISHMENTS.		QUANTITY OF ICE MANUFACTURED (TONS).	
	1909	1899 ¹	1909	1899 ¹
United States.....	2,004	787	12,647,949	4,294,439
Pennsylvania.....	170	73	1,639,936	735,018
New York.....	89	41	1,393,327	457,779
Missouri.....	92	31	849,527	285,796
Ohio.....	97	42	806,663	237,750
Texas.....	182	77	766,166	231,450
Illinois.....	83	29	652,519	249,813
California.....	77	20	593,189	90,679
Indiana.....	85	47	462,704	199,184
Louisiana.....	69	36	454,362	179,716
New Jersey.....	59	26	439,421	169,755
Kansas.....	86	19	402,685	62,486
Maryland.....	42	18	394,453	120,740
Kentucky.....	78	31	337,446	137,472
Georgia.....	61	32	331,708	131,236
Tennessee.....	57	27	315,838	158,931
Virginia.....	74	30	286,832	118,240
Florida.....	70	35	276,159	125,184
Oklahoma ²	77	10	239,988	25,278
Alabama.....	45	23	216,299	55,908
Arkansas.....	49	18	210,161	51,236
Mississippi.....	51	23	180,991	57,207
District of Columbia.....	7	4	161,443	64,950
North Carolina.....	45	23	161,358	61,338
Colorado.....	30	6	153,789	51,545
West Virginia.....	35	8	127,036	35,734
South Carolina.....	32	13	116,394	45,228
Washington.....	25	4	111,661	17,300
Massachusetts.....	7	.....	78,736	.....
Iowa.....	18	3	75,924	13,500
Arizona.....	23	9	67,966	14,709
Michigan.....	5	.....	64,549	.....
Delaware.....	15	7	58,714	26,738
Connecticut.....	7	5	41,848	25,950
Oregon.....	25	9	40,184	17,165
Nebraska.....	7	(³)	36,561	(³)
New Mexico.....	10	*4	30,696	10,915
Utah.....	4	(³)	25,446	(³)
Rhode Island.....	5	(³)	18,112	(³)
Nevada.....	3	.....	11,285	.....
Idaho.....	4	.....	6,576	.....
All other states.....	4	4	11,300	28,509

¹ See footnote 2, Table 15.
² Includes Indian Territory in 1899.
³ Included in "all other states," to avoid disclosure of individual operations.

In 1909 the production of the seven leading states, each of which reported more than 500,000 tons, aggregated 6,701,324 tons, or 53 per cent of the total production. The largest absolute increase for the decade (935,548 tons) is shown by New York, and the next largest (904,918 tons) by Pennsylvania. Many of the states of smaller production, however, show very large relative gains.

Table 17 shows for 1909 the quantity and value of can ice and of plate ice made by the establishments in the industry and of that reported as a subsidiary product by establishments in other industries.

Can ice represented more than nine-tenths (92.6 per cent) of the total quantity of ice manufactured in 1909.

The quantity of ice reported by establishments manufacturing ice as a subsidiary product constituted 11.1 per cent of the total production. Plate ice constituted 7.7 per cent of the total quantity made by establishments engaged primarily in ice manufacture, and 4.8 per cent of the total made in establishments reporting ice as a subsidiary product.

PRODUCT.	TOTAL.		ICE MADE IN ESTABLISHMENTS ENGAGED PRIMARILY IN THE MANUFACTURE OF—			
	Quantity (tons).	Value.	Ice.		Products other than ice.	
			Quantity (tons).	Value.	Quantity (tons).	Value.
Ice, total.....	14,230,208	\$44,139,053	12,647,949	\$39,889,263	1,582,259	\$4,249,790
Can.....	13,177,991	41,123,901	11,671,547	37,085,633	1,500,444	4,038,368
Plate.....	1,052,217	3,015,152	976,402	2,803,730	75,815	211,422

Table 18 shows, for 1909, by states, the number of establishments in the ice industry, the number of establishments in other industries reporting ice as a subsidiary product, and the total quantity and value of ice made by the establishments of each class.

The total number of establishments reporting ice made for sale as a secondary product in 1909 was 338, and the quantity of ice reported was 1,582,259 tons, with a value of \$4,249,790. Thus the aggregate quantity of ice manufactured, exclusive of that made by establishments for their own use, was 14,230,208 tons, and its aggregate value \$44,139,053. The relative importance of the several states in the production of ice, as shown in Table 16, is but slightly affected by the addition of the ice reported as a subsidiary product of other industries.

The average value per ton of ice manufactured by establishments in the industry, as computed from Table 18, was \$3.15. In most of the leading states the average value per ton was somewhat less than the average for the country as a whole; thus in Missouri the value per ton was \$2.33; in New York, \$2.55; in Ohio, \$2.56; in Pennsylvania, \$2.76; in Illinois, \$2.85; and in California, \$3.04. In Texas, however, the average value was \$4.70. In most of the Southern states, in fact, and in those Western states (except California) which reported establishments in the industry, the value per ton was greater than the average for the country as a whole, reaching \$5.26 in Oregon and \$6.08 in Idaho.

For the ice made as a secondary product in other industries the average value per ton was \$2.68, this average being lower in most of the states than that for ice made as a primary product.

MANUFACTURES.

STATE.	NUMBER OF ESTABLISHMENTS MANUFACTURING ICE.			ICE MANUFACTURED.					
	Total.	In ice indus- try.	In other indus- tries.	Total.		By establishments in the ice industry.		By establishments in other industries.	
				Quantity (tons).	Value.	Quantity (tons).	Value.	Quantity (tons).	Value.
United States.....	2,342	2,004	338	14,230,208	\$44,139,053	12,647,949	\$39,889,283	1,582,259	\$4,249,790
Alabama.....	52	45	7	234,256	847,582	216,299	775,681	17,957	71,951
Arkansas.....	54	49	5	218,924	814,510	210,161	779,364	8,763	35,146
California.....	87	77	10	614,382	1,892,065	593,186	1,803,200	21,196	88,865
Colorado.....	33	30	3	188,450	566,478	153,789	530,576	14,661	35,902
Connecticut.....	10	7	3	59,579	180,315	41,848	141,076	17,731	39,239
District of Columbia.....	11	7	4	210,015	458,483	161,443	345,643	48,572	112,840
Georgia.....	67	61	6	363,433	1,196,324	331,708	1,095,388	31,725	100,936
Idaho.....	7	4	3	8,361	49,924	6,576	39,979	1,785	9,945
Illinois.....	110	83	27	737,168	2,083,676	652,519	1,861,262	84,649	222,414
Indiana.....	102	85	17	550,741	1,393,193	462,704	1,188,137	88,037	205,056
Kansas.....	99	86	13	443,730	1,426,560	402,685	1,311,158	41,045	115,404
Kentucky.....	84	78	6	373,644	1,108,673	337,446	1,024,085	36,198	84,588
Louisiana.....	72	69	3	461,134	1,482,938	454,362	1,450,592	6,772	32,346
Maryland.....	45	42	3	411,371	1,051,731	394,453	1,020,218	16,918	31,513
Michigan.....	8	5	3	79,274	179,401	64,549	152,354	14,725	27,047
Mississippi.....	57	51	6	191,506	860,464	180,991	817,093	10,515	43,371
Missouri.....	115	92	23	992,252	2,333,276	849,527	1,978,741	142,725	354,535
New Jersey.....	84	59	5	458,068	1,497,750	439,421	1,440,543	18,647	57,207
New York.....	111	89	22	1,643,339	4,207,641	1,393,327	3,552,942	250,012	654,899
North Carolina.....	48	45	3	164,358	555,400	161,358	639,490	3,000	15,910
Ohio.....	151	97	54	1,085,752	2,613,316	806,663	2,065,689	279,089	547,627
Oregon.....	38	25	13	60,176	296,228	40,184	211,507	19,992	84,721
Pennsylvania.....	198	170	23	1,702,377	4,686,747	1,639,936	4,527,085	62,441	159,662
South Carolina.....	35	32	3	124,794	446,308	116,394	415,306	8,400	31,002
Tennessee.....	81	57	4	341,292	1,347,632	315,838	1,281,710	25,454	65,922
Texas.....	202	182	20	929,479	4,142,793	766,166	3,601,968	163,313	540,825
Virginia.....	82	74	8	320,060	1,193,129	286,832	1,080,396	33,228	112,733
Washington.....	38	25	13	132,513	535,642	111,661	468,835	20,852	66,807
West Virginia.....	47	35	12	174,366	536,127	127,036	442,314	47,330	93,813
All other states.....	259	243	16	975,414	4,054,747	928,887	3,846,983	46,527	207,764

Methods of manufacture.—Table 19 shows, by states and geographic divisions, the number of establish-

ments using the compressor system of ice manufacture and the number using the absorption system.

Table 19	NUMBER OF ESTABLISHMENTS IN THE MANUFACTURED ICE INDUSTRY.							DIVISION AND STATE.	NUMBER OF ESTABLISHMENTS IN THE MANUFACTURED ICE INDUSTRY.						
	Total.		Using compressor system.		Using absorption system.		Using both systems.		Total.		Using compressor system.		Using absorption system.		Using both systems.
	1909	1899 ¹	1909	1899 ¹	1909	1899 ¹	1909		1909	1899 ¹	1909	1899 ¹	1909	1899 ¹	1909
	United States.....								South Atlantic—Continued						
	2,004	787	1,616	571	357	218	31		West Virginia..... 35 8 33 4 2 4						
	New England.....								North Carolina..... 45 23 37 19 7 4 1						
	20	7	16	7	4				South Carolina..... 32 13 27 7 4 6 1						
	1		1						Georgia..... 61 32 39 16 22 16						
	7		6		1				Florida..... 70 35 30 14 38 21 2						
	5	2	4	2	1				East South Central.....						
	7	5	5	5	2				Kentucky..... 231 104 144 61 80 43 7						
	Middle Atlantic.....								Tennessee..... 78 31 33 12 41 19 4						
	318	140	283	129	32	11	3		Alabama..... 57 27 42 22 15 5						
	89	41	77	37	10	4	2		Mississippi..... 45 23 27 14 16 9 2						
	59	26	49	24	10	2			West South Central.....						
	170	73	157	68	12	5	1		Arkansas..... 377 141 337 104 38 37 1						
	East North Central.....								Louisiana..... 49 18 42 18 7						
	273	118	189	75	77	43	7		Oklahoma..... 69 36 53 13 15 23 1						
	97	42	75	30	19	12	3		Oklahoma ² 77 10 72 8 5 2						
	85	47	40	25	43	22	2		Texas..... 182 77 170 65 12 12						
	47	26	68	20	13	9	2		Mountain.....						
	83	29	68	20	13	9	2		Idaho..... 74 20 85 14 7 6 2						
	5		4		1				Colorado..... 4 4 4						
	3		2		1				New Mexico..... 30 6 24 2 5 4 1						
	West North Central.....								Arizona..... 10 4 9 2 1 2						
	203	54	178	41	22	13	3		Utah..... 23 9 22 9						
	18	3	15	2	3	1			Nevada..... 4 1 3 1 1						
	92	31	83	28	8	3	1		Pacific.....						
	7	1	6	1	1				Washington..... 127 33 121 29 3 4 3						
	86	19	74	10	10	9	2		Oregon..... 25 4 23 4 2						
	South Atlantic.....								California..... 25 9 24 9 1						
	381	170	283	111	93	59	5		..... 77 20 74 16						
	15	7	15	7											
	42	18	36	18	5		1								
	7	4	7	4											
	74	30	59	22	15	8									

¹ See footnote 2, Table 15.

² Includes Indian Territory in 1899.

Of the 2,004 establishments engaged primarily in the manufacture of ice for sale in 1909, 1,616, or 80.6 per cent, used only the compressor system; 357, or 17.8 per cent, used the absorption system only; while 31 establishments used both systems. The compressor system predominated in all states except Indiana, Ken-

tucky, and Florida, in which states 50.6, 52.6, and 54.3 per cent, respectively, of the establishments used the absorption system. The increase in the number of establishments using the compressor system between 1899 and 1909 was 1,045, or 183 per cent, and in the number using the absorption system, 141, or 65.3 per cent.

DETAILED STATE TABLES.

The principal data secured concerning the establishments engaged primarily in the manufacture of ice for sale are presented, by states, in Tables 20 and 21.

Table 20 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 21 gives the statistics of the industry in somewhat greater detail for 1909 only.

ICE, MANUFACTURED—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

Table 20	STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
				Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.														
	United States.....	1909 1904 1899	2,004 1,320 775	21,107 13,176 8,858	1,088 746 447	3,927 2,332 1,531	16,114 10,101 6,880	317,789 191,660 100,421	\$118,642 66,592 38,020	\$3,868 2,001 1,226	\$9,779 5,549 3,403	\$11,317 6,011 3,312	\$42,953 23,780 13,781	\$31,636 17,779 10,469
	Alabama.....	1909 1904 1899	45 39 21	469 336 212	26 32 11	100 61 41	343 243 160	6,117 3,784 1,792	2,281 1,450 611	85 52 33	138 104 53	201 122 51	777 532 242	576 410 191
	Arizona.....	1909 1904 1899	23 13 9	152 97 67	9 12 11	26 13 12	117 72 44	2,569 1,190 609	1,080 420 229	28 12 10	112 55 31	144 58 42	501 259 133	357 201 91
	Arkansas.....	1909 1904 1899	49 38 15	458 333 178	17 7 8	89 65 21	352 261 149	8,281 4,622 2,207	1,905 1,317 569	77 45 22	192 123 56	207 106 46	320 488 215	613 382 169
	California.....	1909 1904 1899	77 54 20	854 517 261	35 35 7	153 67 64	666 415 190	9,971 5,788 1,983	7,781 3,550 1,306	212 71 63	572 335 132	564 299 120	2,331 1,307 511	1,767 1,008 391
	Colorado.....	1909 1904 1899	30 16 6	315 182 117	11 9 6	53 35 18	251 138 93	4,361 2,187 292	2,415 1,240 664	65 35 21	190 93 54	126 71 31	570 376 204	444 305 173
	Connecticut.....	1909 1904 1899	7 7 5	89 68 58	5 6 5	18 20 15	66 42 38	1,029 780 779	558 363 317	18 14 18	42 31 21	43 24 16	159 121 95	116 97 79
	Delaware.....	1909 1904 1899	15 10 7	102 87 38	16 6 2	15 17 8	71 64 28	1,028 705 621	393 316 260	9 10 4	31 31 12	49 26 14	153 142 71	104 116 57
	District of Columbia.....	1909 1904 1899	7 6 4	122 108 101	2 1 2	27 13 16	93 94 83	2,683 2,770 1,460	1,485 700 630	27 12 14	78 46 41	90 71 61	350 261 183	260 190 122
	Florida.....	1909 1904 1899	70 47 33	634 405 285	61 41 24	112 69 24	461 295 237	8,585 2,943 2,971	2,459 1,360 726	143 60 21	224 151 96	384 171 129	1,207 684 428	823 513 299
	Georgia.....	1909 1904 1899	61 48 32	651 522 313	27 18 14	130 105 48	494 399 251	8,125 5,353 3,555	3,360 1,705 975	133 76 43	210 142 86	275 200 127	1,163 858 457	888 658 330
	Illinois.....	1909 1904 1899	83 43 29	1,013 648 738	25 29 22	184 134 92	804 485 624	13,288 6,509 4,083	5,575 2,162 1,689	192 110 75	534 269 393	442 247 174	1,928 940 991	1,486 693 817
	Indiana.....	1909 1904 1899	85 66 47	765 547 439	62 52 35	140 104 61	563 391 343	7,726 5,611 3,512	3,318 2,204 1,531	109 73 44	304 199 162	326 161 121	1,311 748 544	985 587 423
	Iowa.....	1909 1904 1899	18 4 3	190 26 46	9 3 3	30 6 10	151 20 33	2,045 784 450	626 187 165	26 5 3	101 12 15	64 16 38	290 51 35	226 35 27
	Kansas.....	1909 1904 1899	86 44 19	789 337 152	45 33 18	151 67 20	593 237 114	14,636 5,569 2,142	4,209 1,373 425	129 55 13	380 145 55	342 141 56	1,460 585 196	1,118 444 140
	Kentucky.....	1909 1904 1899	78 48 31	645 444 266	45 33 22	128 66 52	472 345 192	9,040 8,760 3,201	4,108 1,816 1,200	116 55 33	243 152 84	307 139 82	1,135 703 454	828 564 372
	Louisiana.....	1909 1904 1899	69 62 34	798 586 378	16 27 15	149 101 74	633 458 289	10,556 8,276 4,827	5,333 3,496 2,233	146 87 66	357 236 122	499 333 186	1,501 1,100 571	1,002 767 385
	Maryland.....	1909 1904 1899	42 27 18	466 318 163	31 15 8	80 50 19	355 253 138	7,192 4,280 2,140	2,552 1,888 650	83 46 15	230 126 75	300 150 84	1,022 730 359	722 550 275
	Mississippi.....	1909 1904 1899	51 37 21	477 376 192	25 23 12	111 79 26	341 274 154	7,003 4,171 1,874	1,851 1,266 579	85 64 23	189 119 55	213 145 65	866 603 274	653 453 209
	Missouri.....	1909 1904 1899	92 53 31	975 559 357	32 30 13	182 96 65	761 433 279	22,904 13,546 7,267	6,947 3,318 1,835	183 94 66	472 272 157	667 399 226	2,084 1,130 641	1,417 731 415
	New Jersey.....	1909 1904 1899	59 39 26	581 338 247	27 18 12	98 52 52	456 288 183	10,121 6,677 3,995	3,648 2,749 1,653	98 47 38	317 159 94	386 172 108	1,497 648 392	1,111 476 284
	New Mexico.....	1909 1904 1899	10 7 4	69 32 27	4 3 3	15 4 2	50 23 22	1,378 462 75	424 190 118	16 5 2	33 20 15	42 16 78	144 84 78	102 68 63
	New York.....	1909 1904 1899	89 58 41	1,372 723 399	34 21 17	214 99 63	1,124 603 319	21,375 15,958 5,422	7,766 5,972 2,555	287 100 52	835 424 201	1,044 577 269	3,808 1,749 1,051	2,764 1,172 782
	North Carolina.....	1909 1904 1899	45 32 23	426 317 211	16 13 13	92 69 37	318 235 161	5,386 2,991 2,275	1,514 860 523	80 58 32	127 83 53	180 97 66	659 418 228	479 321 162

ICE, MANUFACTURED—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

Table 20—Continued.	STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
				Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
	Ohio.....	1909	97	1,176	43	241	892	19,058	\$8,381	\$220	\$559	\$564	\$2,270	\$1,706
		1904	69	692	31	141	520	11,882	4,495	111	296	292	1,217	925
		1899	42	395	17	79	299	6,150	1,777	53	155	138	583	445
	Oklahoma.....	1909	77	614	30	135	449	10,359	2,719	101	270	307	1,273	966
		1904	44	285	23	65	197	5,348	1,341	48	107	121	528	407
		1899	9	81	7	19	55	760	227	13	29	31	112	81
	Oregon.....	1909	25	122	27	26	69	1,569	632	29	53	76	257	181
		1904	20	107	14	18	75	1,416	451	15	57	41	217	176
		1899	9	51	7	9	35	720	173	14	25	19	116	97
	Pennsylvania.....	1909	170	2,086	116	364	1,606	35,890	14,404	338	1,023	1,225	4,823	3,598
		1904	109	1,577	57	284	1,236	23,576	9,712	262	732	711	2,936	2,225
		1899	73	1,227	51	246	930	16,646	8,260	170	538	392	2,039	1,647
	Rhode Island.....	1909	5	23	2	4	17	349	141	3	10	19	57	38
		1904	3	11	2	3	6	290	68	1	4	3	19	16
		1899												
	South Carolina.....	1909	32	287	22	47	218	2,964	1,041	44	85	129	433	304
		1904	18	144	8	25	111	1,835	712	23	45	75	244	169
		1899	13	93	7	13	73	1,074	407	10	24	37	116	79
	Tennessee.....	1909	57	986	46	161	779	9,327	2,748	154	362	281	1,324	1,043
		1904	37	487	26	79	382	6,312	1,125	67	191	123	684	561
		1899	27	472	20	67	385	3,589	1,104	59	177	110	638	428
	Texas.....	1909	182	1,874	82	355	1,437	29,905	8,397	354	839	1,092	3,844	2,782
		1904	125	1,144	59	216	869	18,458	5,140	197	451	573	2,084	1,511
		1899	77	824	35	171	618	8,949	2,564	125	305	320	1,184	864
	Virginia.....	1909	74	652	67	110	475	8,553	3,090	93	220	268	1,143	875
		1904	48	445	43	56	346	4,604	1,805	41	138	172	636	464
		1899	30	271	20	46	205	3,494	1,199	35	87	106	428	322
	Washington.....	1909	25	231	10	58	163	2,210	1,487	64	140	141	558	417
		1904	12	119	9	11	99	905	486	14	78	41	243	202
		1899	4	49	1	13	35	425	252	14	26	17	104	87
	West Virginia.....	1909	35	305	23	49	233	5,554	1,595	41	113	111	476	365
		1904	30	217	5	36	176	2,764	1,287	28	94	61	353	292
		1899	8	100	1	19	80	607	413	14	40	22	119	97
	All other states.....	1909	34	339	18	80	241	6,652	2,419	80	194	209	759	550
		1904	7	45	3	6	36	554	238	8	29	27	112	85
		1899	4	50		9	41	475	201	8	24	20	86	66

¹ Includes Indian Territory.

² Figures can not be shown without disclosing individual operations.

Table 21	STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.	
			Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Average number.	Wage earners.		Total.	16 and over.		Under 16.				
						Male.	Female.		Number, 15th day of—			Male.	Female.	Male.	Female.			
									Maximum month.	Minimum month.								
1	United States.....	2,004	21,107	1,066	2,389	1,302	288	18,114	Jy	22,872	Ja	9,847	15,589	16,452	22	116	.....	317,789
2	Alabama.....	45	469	26	67	27	6	343	Jy	517	De	193	339	333	.....	6	.....	6,117
3	Arizona.....	23	152	9	16	9	1	117	Jy	165	Ja	76	100	100	.....	.....	.....	2,669
4	Arkansas.....	49	468	17	53	34	2	352	Jy	575	Ja	158	364	364	.....	.....	.....	8,281
5	California.....	77	854	35	79	60	14	666	Jy	807	Fe	524	645	635	1	9	.....	9,971
6	Colorado.....	30	315	11	24	28	1	251	Au	416	De	165	181	180	.....	1	.....	4,361
7	Connecticut.....	7	89	5	10	5	3	66	Jy	84	Ja	44	63	63	.....	.....	.....	1,029
8	Delaware.....	15	102	16	9	6	.....	71	Je	142	Ja	32	70	70	.....	.....	.....	1,028
9	District of Columbia.....	7	122	2	10	15	2	93	Jy ¹	111	Fe	75	79	79	.....	.....	.....	2,683
10	Florida.....	70	634	61	82	29	1	461	Apr ¹	452	Ja	426	480	480	.....	.....	.....	8,585
11	Georgia.....	61	651	27	87	42	1	494	Jy	678	Ja	320	561	547	.....	14	.....	8,125
12	Idaho.....	4	30	1	6	3	1	19	Au	28	Ja ¹	12	18	17	1	.....	.....	355
13	Illinois.....	83	1,013	25	106	52	20	804	Au	1,134	Ja	479	730	728	1	1	.....	13,288
14	Indiana.....	85	765	62	86	33	21	563	Au	812	Ja	315	495	492	2	1	.....	7,726
15	Iowa.....	18	190	9	19	6	5	151	Au	237	Fe	75	121	119	2	.....	.....	2,045
16	Kansas.....	86	789	45	98	33	20	598	Au	926	Ja	350	491	487	2	2	.....	14,636
17	Kentucky.....	78	645	45	86	34	8	472	Jy	708	Ja	257	463	460	1	2	.....	9,040
18	Louisiana.....	69	798	16	82	65	2	633	Jy	827	Fe	451	618	610	1	7	.....	10,556
19	Maryland.....	42	466	31	60	16	4	365	Au	489	Ja	196	271	270	.....	1	.....	7,192
20	Massachusetts.....	7	64	5	2	.....	2	55	Jy ¹	75	Ja	13	54	54	.....	.....	.....	2,034
21	Michigan.....	5	113	2	10	11	3	87	Au	142	Ja	53	67	67	.....	.....	.....	1,959
22	Mississippi.....	51	477	25	68	37	6	341	Au	500	Ja	185	409	388	.....	21	.....	7,003
23	Missouri.....	92	975	32	114	56	12	761	Au	1,109	Ja	401	836	834	1	1	.....	22,904
24	Nebraska.....	7	62	2	11	18	1	30	Jy	42	Ja ¹	12	34	34	.....	.....	.....	1,193
25	Nevada.....	3	22	6	2	.....	.....	14	Jy	41	Ja ¹	1	13	13	.....	.....	.....	237
26	New Jersey.....	59	581	27	62	30	6	456	Au	662	Ja	234	415	415	.....	.....	.....	10,121
27	New Mexico.....	10	69	4	9	6	.....	50	Jy	78	Fe	21	39	39	.....	.....	.....	1,378
28	New York.....	89	1,372	34	115	86	13	1,124	Jy	1,485	Ja	753	1,091	1,091	.....	.....	.....	21,375
29	North Carolina.....	45	426	16	61	29	2	318	Jy	474	Ja	188	346	340	.....	6	.....	5,386
30	Ohio.....	97	1,176	43	139	69	33	892	Jy	1,308	Ja	525	810	802	8	.....	.....	19,058
31	Oklahoma.....	77	614	30	81	45	9	449	Jy	745	Fe	195	475	470	.....	5	.....	10,359
32	Oregon.....	25	122	27	12	11	3	69	Au	111	Ja ¹	42	70	70	.....	.....	.....	1,569
33	Pennsylvania.....	170	2,086	116	199	120	45	1,606	Jy	2,197	Ja	1,044	1,492	1,489	1	2	.....	35,890
34	Rhode Island.....	5	23	2	3	.....	1	17	Jy	35	Ja ¹	0	25	25	.....	.....	.....	349
35	South Carolina.....	32	237	22	36	8	3	218	Jy	339	Ja	121	250	243	.....	7	.....	2,964
36	Tennessee.....	57	986	46	96	56	9	779	Jy	1,143	Ja	440	749	742	.....	7	.....	9,327
37	Texas.....	182	1,874	82	200	144	11	1,437	Jy	2,130	Ja	808	1,424	1,416	1	7	.....	29,905
38	Utah.....	4	28	1	7	.....	.....	20	Jy	32	Ja ¹	13	26	26	.....	.....	.....	474
39	Virginia.....	74	652	67	60	38	3	475	Jy	685	Ja	281	481	467	.....	14	.....	8,553
40	Washington.....	25	231	10	31	23	4	163	Jy	198	Ja	130	162	162	.....	.....	.....	2,210
41	West Virginia.....	35	305	23	30	17	2	233	Jy	351	Ja	130	214	213	.....	1	.....	5,554
42	All other states ¹	4	20	1	2	1	.....	16	.....	.....	.....	.....	18	18	.....	.....	.....	400

¹ Same number reported for one or more other months.

THE MANUFACTURED ICE INDUSTRY.

STATISTICS, BY STATES: 1909.

Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
	Total.	Services.			Materials.		Miscellaneous.					
		Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1 \$118,941,598	\$31,614,663	\$2,798,366	\$1,089,645	\$8,778,970	\$7,780,397	\$3,587,101	\$413,673	\$840,687	\$82,286	\$5,318,428	\$42,953,056	\$31,635,657
2 2,281,453	536,562	68,242	16,981	138,189	130,687	70,451	6,816	18,841	16	86,340	776,645	675,507
3 1,079,907	350,758	21,060	6,692	111,711	118,965	24,621	-----	10,243	-----	57,466	601,228	357,642
4 1,904,571	604,048	54,385	22,435	191,800	158,526	48,060	17,617	16,971	405	93,849	819,338	613,352
5 7,781,176	1,724,332	145,324	66,788	672,460	430,375	133,267	7,250	46,466	8,618	313,784	2,381,302	1,787,660
6 2,415,090	445,382	36,830	26,209	189,803	93,163	32,942	1,510	15,270	-----	47,665	669,839	443,734
7 558,152	121,168	13,537	4,782	42,264	27,740	15,770	1,000	2,980	-----	13,115	159,346	115,836
8 392,846	100,227	6,370	2,966	31,486	32,981	16,602	-----	1,606	147	8,269	153,138	103,655
9 1,485,295	249,825	17,090	9,712	78,320	57,122	33,375	1,600	4,249	-----	48,357	349,547	259,500
10 2,459,103	892,995	116,961	26,280	223,645	236,634	147,406	2,190	17,530	7,555	114,794	1,206,874	822,834
11 3,360,459	786,070	106,317	26,857	209,872	203,489	71,611	3,977	31,083	2,476	130,389	1,162,636	887,536
12 188,597	47,174	9,060	2,245	13,953	10,031	1,611	-----	1,558	1,788	6,928	64,828	53,186
13 5,574,739	1,424,435	145,830	46,246	534,166	291,192	150,738	7,298	26,012	3,682	219,271	1,928,323	1,486,393
14 3,318,406	961,914	84,105	24,469	304,197	213,131	112,675	5,810	24,098	19,771	173,658	1,310,556	984,750
15 626,197	218,802	20,025	6,605	101,335	44,172	19,778	1,300	4,673	-----	21,914	289,642	225,992
16 4,208,797	1,060,309	102,343	26,418	379,704	248,224	93,514	203	34,704	1,725	173,474	1,459,842	1,118,104
17 4,108,436	840,477	94,241	21,702	243,338	193,775	113,080	6,700	21,775	419	145,447	1,134,590	827,735
18 5,332,868	1,252,875	97,719	48,034	356,573	361,464	137,074	111	35,098	900	215,902	1,500,985	1,002,447
19 2,552,240	838,017	70,199	13,194	229,676	197,510	102,039	4,729	14,377	6,757	199,516	1,022,360	722,791
20 344,125	136,223	3,000	569	41,827	45,299	21,832	-----	3,780	-----	19,916	202,915	135,784
21 676,553	153,786	10,260	9,720	77,174	20,022	20,440	-----	3,915	-----	12,255	199,105	158,643
22 1,850,644	602,083	54,190	31,158	188,610	135,985	76,708	1,115	22,544	1,004	90,769	866,358	653,665
23 6,947,040	1,612,565	132,245	50,901	471,583	471,106	196,106	70,800	33,317	7	186,500	2,083,896	1,416,674
24 413,648	102,250	8,595	20,658	21,066	26,455	13,552	40	1,145	-----	10,739	124,887	84,830
25 299,199	33,719	2,400	-----	12,436	10,019	2,122	-----	1,509	-----	6,233	39,117	26,976
26 3,647,701	1,009,602	73,953	24,066	317,015	264,731	121,345	8,484	23,674	3,469	172,865	1,496,555	1,110,479
27 424,336	111,344	10,872	5,166	32,605	32,977	9,124	50	4,155	22	16,373	144,164	102,063
28 7,765,592	2,936,243	212,628	74,222	834,547	760,287	283,981	161,302	66,386	5,301	537,689	3,808,070	2,763,802
29 1,514,394	482,496	60,445	19,704	127,046	121,572	58,246	12,925	16,906	-----	65,652	659,377	479,559
30 8,380,852	1,736,257	163,192	56,538	558,738	414,763	149,621	15,499	59,052	458	318,376	2,270,112	1,705,728
31 2,719,197	902,240	73,841	27,372	270,051	195,296	111,760	1,287	32,626	8,147	181,860	1,272,515	965,459
32 631,775	188,802	19,700	9,542	52,568	63,678	21,899	4,370	4,396	125	22,524	256,966	181,399
33 14,404,140	3,362,417	223,032	116,075	1,022,959	743,951	481,309	41,117	87,930	-----	647,044	4,822,884	3,597,624
34 140,918	42,489	2,745	390	10,301	9,015	9,773	4,000	379	-----	5,885	57,446	38,658
35 1,040,746	307,834	38,565	5,747	84,882	89,520	39,043	212	8,330	2,051	39,484	432,666	304,103
36 2,747,694	1,028,451	109,988	43,527	362,167	189,814	91,224	235	28,293	-----	203,203	1,324,400	1,043,362
37 8,396,828	2,799,161	238,873	114,702	839,087	797,542	294,301	8,221	72,255	6,358	427,822	3,844,120	2,752,277
38 402,491	67,733	10,600	-----	15,998	21,420	7,600	-----	3,310	-----	8,805	93,190	64,170
39 3,090,340	754,961	63,758	23,888	220,163	185,196	82,712	6,110	20,051	18	149,065	1,143,358	875,450
40 1,486,894	437,785	39,546	24,903	139,576	70,261	70,867	8,631	9,658	-----	74,343	557,711	416,583
41 1,594,863	319,950	29,499	11,877	113,181	62,718	47,887	2,164	8,566	1,069	42,989	475,527	364,922
42 93,238	30,892	1,800	225	12,678	9,569	1,135	-----	1,276	-----	4,009	36,107	25,403

* All other states embrace: Vermont, 1 establishment; Wisconsin, 3.

RICE CLEANING AND POLISHING

RICE CLEANING AND POLISHING.

Scope of the industry.—The establishments assigned to this industry are engaged in cleaning the rough rice of dirt and other foreign substances, removing the outer shell or hull, and the inner cuticle or bran, and, in most instances, polishing the grain by friction so as to give it a pearly luster. There are two methods of conducting the business—merchant milling, in which the rough rice is purchased, milled, and the products sold; and custom milling, in which the rough rice belonging to others is treated on a contract basis for a stipulated price or for a portion of the rice itself. Table 1 distinguishes the quantities of rough rice and its several products according to the basis upon which the rice was treated.

Of the 71 establishments reported for 1909, 41 were engaged exclusively in merchant milling, 8 exclusively in custom milling, and 22 in both merchant and custom milling. Where mills employed both methods, merchant milling, as a rule, constituted the greater proportion of the business, only 18.3 per cent of the rice milled by such establishments being treated on a custom basis. In recent years there has been a decided change in the relative importance of the two methods of conducting business. In 1904 there were 12 mills engaged exclusively in merchant milling, 31 exclusively in custom milling, and 31 in both merchant and custom milling, the larger part

of the operations of mills of the last class being custom milling. Of the total quantity of rough rice treated in 1909, 90.2 per cent was handled on a merchant basis and 9.8 per cent on a custom basis. The quantities of whole rice obtained by merchant milling and by custom milling were equal to 49.5 per cent and 44.1 per cent of the gross weight of the rough rice treated on these respective bases. The corresponding percentages for broken rice were 15.2 and 15.4, respectively.

	RICE MILLING: 1909			PER CENT OF TOTAL.	
	Total.	Merchant.	Custom.	Mer- chant mill- ing.	Cus- tom mill- ing.
Rough rice treated, pounds	974,747,475	879,596,100	95,151,375	90.2	9.8
Domestic.....	970,873,740	875,722,365	95,151,375	90.2	9.8
Foreign.....	3,873,735	3,873,735	.....	100.0	.....
Products, total value.....	\$22,371,457	\$20,276,214	\$2,095,243	90.6	9.4
Clean rice.....	626,089,489	569,522,512	56,566,977	91.0	9.0
value.....	\$20,685,982	\$18,854,958	\$1,831,024	91.1	8.9
pounds.....	477,589,004	435,648,814	41,940,190	91.2	8.8
value.....	\$17,398,736	\$15,888,560	\$1,510,176	91.3	8.7
Whole rice.....	148,500,485	133,873,698	14,626,787	90.2	9.8
value.....	\$3,287,246	\$2,966,398	\$320,848	90.2	9.8
Broken rice.....	23,821,513	26,963,710	2,858,103	90.4	9.6
value.....	\$362,052	\$334,200	\$27,852	92.3	7.7
Polish.....	.....	.....	.....	82.1	17.9
All other products.....	\$1,323,423	\$1,087,056	\$236,367	.....	.....

Summary and comparison with earlier censuses.—Table 2 summarizes the statistics of the industry, as a whole, for each census from 1879 to 1909, inclusive.

	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹				
	1909	1904	1899	1889	1879	1899- 1909	1904- 1909	1899- 1904	1889- 1899	1879- 1889
Number of establishments.....	71	74	80	32	22	-11.2	-4.1	-7.5	150.0	45.5
Persons engaged in the industry.....	1,777	1,961	891	(2)	(2)	99.4	-9.4	120.1	.....	.....
Proprietors and firm members.....	88	33	71	(2)	(2)	-46.5	15.2	-53.5	.....	.....
Salaried employees.....	500	436	169	(2)	(2)	195.9	14.7	158.0	.....	.....
Wage earners (average number).....	1,239	1,492	651	647	516	90.3	-17.0	129.2	0.6	25.4
Primary horsepower.....	19,519	15,866	7,546	4,120	(2)	158.7	23.0	110.3	83.2	.....
Capital.....	\$13,347,144	\$8,821,099	\$2,601,352	\$2,073,884	\$562,200	413.1	51.3	239.1	25.4	268.9
Expenses.....	21,548,545	15,119,842	8,253,343	(2)	(2)	161.1	42.5	83.2	.....	.....
Services.....	1,176,623	1,189,194	447,618	(2)	(2)	162.9	-1.1	165.7	.....	.....
Salaries.....	613,085	548,562	182,033	(2)	(2)	236.8	11.8	201.4	.....	.....
Wages.....	563,538	640,632	265,585	223,433	110,467	112.2	-12.0	141.2	18.9	102.3
Materials.....	19,501,080	13,315,065	7,575,522	5,601,206	2,666,497	157.4	46.5	75.8	35.2	110.1
Miscellaneous.....	870,842	615,583	230,203	147,992	(2)	278.3	41.5	167.4	55.6	.....
Value of products.....	22,371,457	16,296,916	8,723,726	6,693,196	3,133,324	156.4	37.3	86.8	30.3	113.6
Value added by manufacture (value of products less cost of materials).....	2,870,377	2,981,851	1,148,204	1,091,990	466,827	150.0	-3.7	159.7	5.1	133.9

¹ A minus sign (-) denotes decrease.

² Comparable figures not available.

In 1909 there were 71 establishments engaged in cleaning and polishing rice. In these establishments 1,777 persons were engaged, of whom 1,239 were wage earners. The value of products was \$22,371,457, but the value added by manufacture was only \$2,870,377, the cost of materials being equal to 87.2 per cent of the total value of products.

Rice has been cultivated in the United States for more than 200 years, and prior to the Civil War had reached considerable proportions. The largest gain, however, has occurred during the last decade, during which period the production quadrupled. The first census statistics of rice cleaning and polishing were secured in 1880; they covered the year 1879 and

showed 22 establishments engaged in the industry. At the census of 1889 there were 32 establishments, and in 1899, 80 establishments. The total value of products in 1909, \$22,371,457, was more than seven times the value reported for 1879. This total represents an increase of 234.2 per cent over the value of products reported in 1889, 156.4 per cent over that in 1899, and 37.3 per cent over that in 1904.

The statistics of persons engaged in the industry at the censuses of 1879 and 1889 are not strictly comparable with those for the later years. It is apparent, however, that the improvements in machinery and in methods of treatment have resulted in a disproportionate growth in value of products as compared with

number of wage earners, since the use of more elaborate machinery tends to increase the size or capacity of establishments without proportionately increasing the number of employees. The number of wage earners in the industry increased greatly between 1899 and 1904, but decreased somewhat in the period 1904-1909.

General statistics, by states.—The principal data secured by the census inquiry concerning the rice cleaning and polishing industry are presented by states in Table 3, which shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the industry, primary horsepower, capital invested, principal items of expense, value of products, and value added by manufacture.

RICE CLEANING AND POLISHING—COMPARATIVE SUMMARY, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	71	1,777	38	500	1,239	19,619	\$13,347	\$813	\$564	\$19,501	\$22,371	\$2,870
	1904	74	1,961	33	438	1,492	15,868	8,821	549	641	13,315	16,297	2,982
	1899	80	891	71	169	651	7,546	2,601	182	266	7,576	8,724	1,148
Arkansas.....	1909	5	64		27	37	1,610	575	23	23	852	945	93
	1904												
	1899												
Louisiana.....	1909	37	960	10	257	693	10,706	8,385	338	327	10,971	12,529	1,558
	1904	43	1,167	12	232	923	10,333	6,138	288	400	8,973	10,718	1,745
	1899	37	564	26	126	412	5,079	1,818	141	181	4,954	5,736	782
South Carolina.....	1909	3	69	2	13	53	490	352	14	16	381	466	85
	1904	4	114	3	19	92	707	317	10	15	505	555	50
	1899	18	152	22	18	112	913	293	16	25	857	973	116
Texas.....	1909	10	643	22	101	430	6,274	3,820	224	189	7,122	8,142	1,020
	1904	17	609	6	171	432	4,509	2,139	225	212	3,508	4,640	1,132
	1899												
Washington.....	1909	3	8	2	1	5	20	15	1	3	44	62	13
	1904	4	16	10		6	27	15		3	34	40	6
	1899												
All other states ²	1909	4	33	1	11	21	410	200	13	6	131	227	96
	1904	6	55	2	14	39	290	212	17	11	295	344	40
	1899	25	175	23	25	127	1,554	490	25	60	1,765	2,015	250

¹ Figures included under "all other states."

² All other states embrace: In 1909—Georgia, 2 establishments; North Carolina, 1; Oregon, 1. In 1904—California, 1; Georgia, 3; North Carolina, 1; Oregon, 1. In 1899—Alabama, 4; California, 1; Florida, 4; Georgia, 4; Mississippi, 2; New York, 2; North Carolina, 4; Oregon, 1; Texas, 1; Washington, 2.

With the exception of Oregon and Washington, where only foreign-grown rice was treated, the industry of rice cleaning and polishing was confined in 1909 to six Southern states. The establishments in these states treated domestic rice exclusively. Louisiana reported 56 per cent of the total value of products, and Texas 36.4 per cent, leaving only 7.6 per cent for all other states combined. These two states employed 90.6 per cent of the average number of wage earners. Louisiana reported 65.7 per cent of the total value of products in 1899, South Carolina 11.2 per cent, while Texas, with one establishment, was included under "all other states."

There was thus between 1899 and 1909 considerable change in the relative importance of the different states in the industry. The number of establishments in Georgia, North Carolina, and South Carolina decreased greatly, while Alabama, California, Florida, Mississippi, and New York, each of which reported one or more establishments in 1899, returned none in 1909. The number of establishments in Texas increased from 1 in 1899 to 19 in 1909, and Arkansas, which had none in 1899, had 5 establishments in 1909.

This shift in the industry was due to the very general abandonment of rice growing on the lowlands near the Atlantic and Gulf coasts, and to its introduction

with irrigation on the level prairie lands of Louisiana, Texas, and Arkansas, where machinery can be used in planting and harvesting. According to the census of agriculture, the acreage in rice in these three states in 1899 was 210,421, or 61.5 per cent of the total for the country, and the production of rough rice in them was 6,472,227 bushels, or 71.9 per cent of the total. In 1909 these states reported 582,523 acres out of a total of 610,175 acres for the country, while their production, 21,114,548 bushels, formed 96.7 per cent of the total. During the intervening period the acreage devoted to rice in Louisiana, Texas, and Arkansas increased 176.8

per cent and the production 226.2 per cent, while in all other states combined the acreage decreased 79 per cent and the production 71.4 per cent.

With the shift in the industry has come the abandonment of many small custom mills and the erection of large mills equipped with the latest improved machinery for cleaning and polishing the grain. The horsepower for running the mills was 7,546 in 1899, or an average of 94 per establishment; it had increased to 19,519 in 1909, an average of 275 per establishment.

Table 4 gives more detailed statistics, by states, for 1909.

RICE CLEANING AND POLISHING—DETAILED STATISTICS, BY STATES: 1909.

Table 4	United States.	Arkansas.	Louisiana.	South Carolina.	Texas.	Washing- ton.	All other states. ¹
Number of establishments	71	5	37	3	19	3	4
Persons engaged in the industry	1,777	64	960	69	643	8	33
Proprietors and firm members	38		10	3	22	2	1
Salaried officers, superintendents, and managers	144	8	72	6	51	1	6
Clerks	356	19	185	7	140		5
Male	340	19	172	6	139		4
Female	16		13	1	1		1
Wage earners:							
Average number	1,239	37	693	53	430	5	21
Number, 15th day of month:							
Maximum—							
Month	October.	October.	October.	October.	November.	² May.	
Number	2,017	117	1,180	93	624	8	
Minimum—							
Month	July.	³ April.	June.	April.	July.	² January.	
Number	436	0	188	26	115	4	
Wage earners, Dec. 15, or nearest representative day	1,719	96	939	90	562	8	24
16 years of age and over	1,713	96	935	88	562	8	24
Male	1,706	96	929	88	562	8	24
Female	6		6				
Under 16 years of age	6		4	2			
Male	6		4	2			
Female							
Primary horsepower	19,519	1,610	10,706	490	6,274	20	419
Capital	\$13,347,144	\$575,312	\$8,385,212	\$351,649	\$3,820,027	\$15,458	\$199,486
Expenses	21,548,545	940,524	12,099,348	420,361	7,868,582	48,595	171,135
Services	1,176,623	46,134	664,503	30,461	412,709	3,620	19,196
Officials	296,385	11,975	165,850	8,320	99,680	1,000	9,560
Clerks	316,700	11,311	172,116	5,660	124,007		3,606
Wage earners	563,538	22,848	326,537	16,481	189,022	2,620	6,030
Materials	19,501,080	851,663	10,870,862	380,789	7,122,417	44,356	130,983
Fuel and rent of power	124,736	2,446	68,141	2,944	47,481	556	3,168
Other	19,376,344	849,247	10,902,721	377,845	7,074,936	43,800	127,795
Miscellaneous	870,842	42,697	463,683	9,111	333,456	619	20,976
Rent of factory	18,934		6,320		4,650	564	7,400
Taxes	71,335	421	41,778	5,445	21,939	35	1,717
Other	780,573	42,276	415,885	3,666	306,867	30	11,859
Value of products	22,371,457	944,726	12,528,656	466,344	8,142,438	62,505	226,788
Value added by manufacture (value of products less cost of materials)	2,870,377	93,033	1,557,794	85,555	1,020,021	18,149	95,825

¹ All other states embrace: Georgia, 2 establishments; North Carolina, 1; Oregon, 1.
² Same number reported for one or more other months.
³ None reported for one or more other months.

Persons engaged in the industry.—Table 5 shows, by classes, for 1909, the number of persons engaged in the rice cleaning and polishing industry, classified according to occupational status and sex, and, in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the rice cleaning and polishing industry in 1909 was 1,777, of whom 1,239, or 69.7 per cent, were wage earners; 182, or 10.2 per cent, proprietors and officials; and 356, or 20 per cent, clerks. Of the total number of persons engaged in the industry, 1,756, or 98.8 per cent, were

males. The number of women and children employed as wage earners was insignificant.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 3. Table 4 shows, by states, the sex and age distribution of the wage earners employed on December 15, 1909, or the nearest representative day.

The largest number of wage earners employed in the rice cleaning and polishing industry during any month in 1909 was 2,017, in October, and the smallest number, 436, in July, the minimum number forming 21.6 per cent of the maximum. The height of the rice cleaning and polishing season extends from September to December, inclusive, during which period the number of wage earners fluctuated from 1,750 to 2,017.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	1,777	1,756	21
Proprietors and officials.....	182	181	1
Proprietors and firm members.....	38	37	1
Salaried officers of corporations.....	43	43	.....
Superintendents and managers.....	101	101	.....
Clerks.....	356	340	16
Wage earners (average number).....	1,239	1,235	4
16 years of age and over.....	1,235	1,231	4
Under 16 years of age.....	4	4	.....

Character of ownership.—Of the establishments engaged in the rice cleaning and polishing industry in 1909, 57 were operated by corporations, 5 by firms, and 9 by individuals. Of the wage earners, 1,063, or 85.8 per cent, were employed by corporations; 73, or 5.9 per cent, by firms; and 103, or 8.3 per cent, by individuals. The proportions of the value of products reported by establishments under each form of ownership were as follows: Corporations, 89 per cent; firms, 4.6 per cent; and individuals, 6.4 per cent.

Establishments classified according to size.—Of the establishments engaged in cleaning and polishing rice in 1909, three had a value of products in excess of \$1,000,000 each. They reported products valued at \$4,715,441, or 21.1 per cent of the total for the industry. Fifty-one establishments, reporting an aggregate value of products of \$16,957,715, or 75.8 per cent of the total, each returned a value of products of \$100,000 but less than \$1,000,000. The mills of these two groups combined, those reporting products valued at \$100,000 or more, constituted 76.1 per cent of the total number of establishments, employed 93 per cent of the average number of wage earners, and reported 96.9 per cent of the total value of products. The smaller mills, those reporting products valued at less than \$100,000, while constituting almost one-fourth of the number of establishments, milled only a very small proportion of the total rice treated.

The classification of establishments according to the quantity of rice treated, is, of course, closely related to their classification according to value of products. Eighteen establishments treated each less than 100,000 bushels (45 pounds to the bushel) in 1909; 23 treated between 100,000 and 300,000 bushels; 19, between 300,000 and 500,000 bushels; and 11, over 500,000 bushels. Of the 11 largest mills, 4 in Louisiana treated 4,254,451 bushels of rough rice in the aggregate, and 7 in Texas, 4,699,500 bushels.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account

of depreciation, and consequently they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 2 shows the total reported expenses in 1909 to have been \$21,548,545, divided as follows: Materials, \$19,501,080, or 90.5 per cent; wages, \$563,538, or 2.6 per cent; salaries, \$613,085, or 2.8 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$870,842, or 4 per cent. The processes in this industry are so simple that the items of expense other than cost of materials are comparatively small. There are only slight variations among the different states in the distribution of expenses.

Engines and power.—Table 6 shows, for the rice cleaning and polishing industry, the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current) and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments using them.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	154	112	98	19,519	15,866	7,546	100.0	100.0	100.0
Owned.....	130	106	99	18,404	15,774	7,266	94.3	99.4	96.3
Steam.....	125	106	90	18,252	15,774	7,002	93.5	99.4	92.8
Gas.....	4	.....	.....	137	.....	.....	0.7	.....	.....
Water wheels.....	.....	.....	9	.....	.....	264	.....	.....	3.5
Water motors.....	1	.....	.....	15	.....	.....	0.1	.....	.....
Rented — Electric motors.....	24	6	(¹)	1,115	92	280	5.7	0.6	3.7
Electric motors.	54	24	2	1,738	477	307	100.0	100.0	100.0
Run by current generated by establishment.....	30	18	2	623	385	27	35.8	80.7	8.8
Run by rented power.....	24	6	(¹)	1,115	92	280	64.2	19.3	91.2

¹ Not reported.

The total primary power reported for the industry was 7,546 in 1899 and 19,519 in 1909, an increase of 11,973 horsepower, or 158.7 per cent. Steam power constituted 92.8 per cent of the total in 1899, 99.4 per cent in 1904, and 93.5 per cent in 1909. The decrease in the proportion of steam power during the period 1904–1909 was due to the introduction of gas and other internal-combustion engines and the relatively large increase in the horsepower of electric motors run by purchased current (rented electric power).

Fuel.—Closely related to the question of the kind of power employed is that of the fuel consumed in generating the power. The total cost of fuel and of rented power for the industry in 1909, as shown by Table 4, was \$124,736. The fuel consumed consisted of 10,049 tons of coal, 3,148 cords of wood, and 56,873 barrels of oil, the entire quantity of the last named being returned for Louisiana and Texas, where it is generally used in generating steam power. The hulls obtained

in cleaning rough rice are extensively used as fuel, but no data were collected as to the quantity so used.

Materials and products.—The special schedule used in collecting the statistics for the rice cleaning and polishing industry required a statement of the quantity of rough rice treated, whether domestic or foreign, and of the quantities and values of the different products manufactured. Table 7 shows these statistics, by states, for 1909 and 1904 and so far as available for 1899.

RICE CLEANING AND POLISHING—MATERIALS AND PRODUCTS, BY STATES: 1909, 1904, AND 1899.

Table 7	Census.	United States.	Arkansas.	Louisiana.	South Carolina.	Texas.	Washington.	All other states. ¹	
Number of establishments.....	1909	71	5	37	3	19	3	4	
	1904	74		43	4	17	4	6	
	1899	80		37	18	1	2	22	
Rough rice treated, pounds.....	1909	974,747,475	37,014,075	540,002,250	17,175,015	371,816,370	1,360,170	7,379,595	
	1904	999,727,659		635,010,885	28,552,860	316,170,405	788,985	19,204,515	
	1899	398,602,018		290,165,708	42,405,795	(²)	(²)	66,030,515	
Products, aggregate value.....	1909	\$22,371,457	\$944,726	\$12,528,656	\$466,344	\$8,142,438	\$62,505	\$226,788	
	1904	16,296,916		10,718,311	554,575	4,640,269	40,300	343,461	
	1899	8,723,726		5,736,451	973,132	(²)	(²)	2,014,143	
Clean rice—									
	Total pounds.....	1909	626,089,489	23,197,442	351,302,414	9,466,200	236,117,295	1,229,000	4,777,138
		1904	623,900,245		394,744,386	17,825,732	197,433,320	713,913	13,182,894
1899		243,031,200		173,632,724	24,864,112	(²)	(²)	44,534,364	
Total value.....	1909	\$20,685,982	\$810,421	\$11,640,318	\$396,459	\$7,571,780	\$61,043	\$205,961	
	1904	15,357,133		10,110,144	527,686	4,352,058	40,155	327,090	
Whole rice—									
	Pounds.....	1909	477,589,004	15,786,890	291,604,848	8,299,800	156,877,308	1,209,000	3,811,158
1904		411,208,943		287,460,640	13,677,357	102,812,839	713,713	6,544,394	
Value.....	1909	\$17,398,736	\$679,455	\$10,080,627	\$373,325	\$6,029,514	\$60,718	\$175,097	
	1904	12,077,124		8,520,090	447,721	2,851,807	40,153	217,353	
Broken rice—									
	Pounds.....	1909	148,500,485	7,410,552	59,697,566	1,166,400	79,239,987	20,000	965,980
1904		212,691,302		107,283,746	4,148,375	94,620,481	200	6,638,500	
Value.....	1909	\$3,287,246	\$130,966	\$1,559,691	\$23,134	\$1,542,266	\$325	\$30,864	
	1904	3,280,009		1,590,054	79,965	1,500,251	2	109,737	
Polish—									
	Pounds.....	1909	29,821,813	1,105,072	17,558,068	612,753	10,402,638		143,282
1904		33,290,331		22,526,750	701,260	9,500,830		561,491	
1899	15,134,648		11,491,319	1,648,211	(²)	(²)	1,995,118		
Value.....	1909	\$362,052	\$12,275	\$207,317	\$7,329	\$132,258		\$2,873	
	1904	267,647		178,608	6,915	77,578		4,546	
All other products.....	1909	\$1,323,423	\$122,030	\$681,021	\$62,556	\$438,400	\$1,462	\$17,954	
	1904	672,136		429,559	19,974	210,633	145	11,825	

¹ All other states embrace: In 1909—Georgia, 2 establishments; North Carolina, 1; Oregon, 1. In 1904—California, 1; Georgia, 3; North Carolina, 1; Oregon, 1. In 1899—Alabama, 4; California, 1; Florida, 4; Georgia, 4; Mississippi, 2; New York, 2; North Carolina, 4; Oregon, 1; Texas, 1; Washington, 2.

² Figures included under "all other states."

The quantity of rough rice treated increased from 398,602,018 pounds in 1899 to 974,747,475 pounds in 1909, although the quantity in the later year was 24,980,175 pounds less than that returned in 1904. This decrease in the quantity milled during the second five-year period was due, in part, to the falling off in foreign rice treated, and in part to the fact that the supply of domestic rough rice available for this purpose was not as large. There was, between 1904 and 1909, a decrease in rough rice treated of 95,008,635 pounds in Louisiana, of 11,377,845 pounds in South Carolina, and of 11,824,920 pounds in "all other states," and an increase of 55,645,965 pounds in Texas and of 571,185 pounds in Washington, while Arkansas returned 37,014,075 pounds in 1909 and none in 1904.

Notwithstanding the decrease in quantity of rough rice treated, there was an increase of 2,189,244 pounds

in the aggregate quantity of clean rice obtained in 1909, as compared with 1904. In 1899 the weight of clean rice obtained was 61 per cent of the weight of the rough rice treated; in 1904, 62.4 per cent; and in 1909, 64.2 per cent. The gain in the proportion of clean rice obtained, while due to some extent to improvements in mill equipment and better methods of treatment, was also caused in part by changes in the proportions of the different varieties of rough rice treated. In recent years much attention has been given to the selection of seed, with special reference to the yield and to the milling qualities, and this naturally has increased the proportion of clean rice obtained, as well as the proportion of whole rice as distinguished from broken rice and polish.

The proportion of clean rice obtained varies considerably in different states. In Arkansas the proportion

in 1909 was 62.7 per cent; in Louisiana, 65.1 per cent; in South Carolina, 55.1 per cent; in Texas, 63.5 per cent; and in Washington, 90.4 per cent. The rice treated in Washington, however, was imported hulled rice, and the rice was not polished by the mills, the only substance removed being the bran. The proportions of clean rice for the several states in 1904 were as follows: Louisiana, 62.2 per cent; South Carolina, 62.4 per cent; Texas, 62.4 per cent; and Washington, 90.5 per cent.

Of the total clean rice obtained in 1909 (626,089,489 pounds) 477,589,004 pounds, or 76.3 per cent, was whole rice, as compared with 411,208,943 pounds, or 65.9 per cent of the total (623,900,245 pounds), in 1904. Thus in 1904, 34.1 per cent of the clean rice was broken, as compared with only 23.7 per cent in 1909, an undoubted evidence of the greater efficiency of the mills and of improvement in the varieties of the grain. With the increase in the proportion of clean rice obtained has come a decrease in quantity of polish and bran. In view of the fact that hulls are generally used for fuel and that only a small proportion is sold, accurate data as to the total production are not available. Hulls are used to some extent in the manufacture of feed and for packing ice, crockery ware, and other articles of commerce. The exportation of hulls amounts to about \$100,000 per year, Germany taking more than one-half of the total.

The value of products increased \$13,647,731, or 156.4 per cent, from 1899 to 1909, and \$6,074,541, or 37.3 per cent, from 1904 to 1909. The increase during the latter period is due not to an increase in the quantity of rice milled, but to the increase in the proportion of clean rice obtained and to the enhanced value of rice products. The increase in value of

products from 1904 to 1909 in Louisiana was \$1,810,345; in Texas, \$3,502,169; and in Washington, \$22,205; while South Carolina shows a decrease of \$88,231, and "all other states" a decrease of \$116,673.

Equipment and capacity.—Table 8 shows, by states, the number of hulling and polishing machines in rice mills in 1909 and the estimated maximum capacity of rough rice per day of 24 hours.

STATE.	Hulling machines (number).	Polishing machines (number).	Estimated maximum capacity of rough rice per day of 24 hours (bushels of 45 pounds).
United States	521	150	341,409
Arkansas.....	21	8	23,520
Louisiana.....	303	86	190,025
South Carolina.....	44	9	9,500
Texas.....	120	45	112,220
Washington.....	16	.....	484
All other states.....	12	2	5,660

The hulling machines used are of many varieties, varying from the mechanically operated mortar and pestle to the highest type of rotary hulling machines. The polishing machines are as diversified as the hulling machines, some of them being skin pads operated in such a manner that the rice grains are treated by rubbing them against each other and against the pads.

In 1909 for all mills combined the estimated maximum capacity of rough rice per day of 24 hours was 341,409 bushels of 45 pounds each. This compares with 301,545 bushels in 1904, an increase of 39,864 bushels, or 13.2 per cent. Had all the mills been operated continuously to their maximum capacity it would have required approximately 63 days to treat the total quantity of rough rice actually reported for the year.

HAWAII.

None of the statistics heretofore presented include data for the rice cleaning and polishing industry in Hawaii, where it is largely in the hands of the Chinese and Japanese. Some of the mills treat only the rice grown on the plantation where the mill is situated, some treat only foreign rice, while a number handle Hawaiian rice largely on a custom basis. The first census in Hawaii, following the annexation to the United States, covered the year 1899 and the next related to 1909, no data having been collected there for 1904.

Table 9 summarizes the statistics for the rice cleaning and polishing industry in Hawaii for 1899 and 1909.

Table 9	NUMBER OR AMOUNT.		Per cent of increase. ¹
	1909	1899	
Number of establishments.....	74	41	80.5
Persons engaged in the industry.....	518	267	94.0
Proprietors and firm members.....	346	76	355.3
Salaried employees.....	34	18	88.9
Wage earners (average number).....	138	173	-20.2
Primary horsepower.....	1,428	609	134.5
Capital.....	\$715,735	\$381,625	87.5
Expenses.....	\$1,692,997	\$566,478	198.9
Services.....	\$46,777	\$61,224	-23.6
Salaries.....	\$11,255	\$12,100	-7.0
Wages.....	\$35,522	\$49,124	-27.7
Materials.....	\$1,600,748	\$481,925	232.2
Fuel and rent of power.....	\$14,520	\$4,857	198.9
Other.....	\$1,586,228	\$477,068	232.5
Miscellaneous.....	\$45,472	\$23,329	94.9
Rent of factory or works.....	\$6,087	\$8,610	-29.3
Taxes.....	\$4,982	\$2,174	129.2
Other.....	\$34,403	\$12,545	174.2
Products, total value.....	\$2,238,667	\$664,300	237.0
Clean rice.....	51,967,465 pounds	15,001,020	246.4
Whole.....	51,381,561 pounds	(2)	.....
Broken.....	585,904 pounds	(2)	.....
Bran.....	6,415,232 pounds	(2)	.....
All other.....	\$67,689 value	(2)	.....
Value added by manufacture (value of products less cost of materials).....	\$637,919	\$182,375	249.8

¹ A minus sign (-) denotes decrease.

² Comparable figures not available.

The number of establishments engaged in rice cleaning and polishing in Hawaii, as enumerated in 1909, was 74, of which 35, with products valued at \$1,032,904, were engaged exclusively in merchant milling; 7, with products valued at \$737,848, exclusively in custom milling; and 32, with products valued at \$467,915, in both merchant and custom milling. In addition to these there were a number of very small mills, with a

product valued at less than \$500 each, for which reports were not secured. During the decade 1899-1909 the number of establishments increased 33; the value of products increased from \$664,300 to \$2,238,667, or 237 per cent; and the value added by manufacture (value of products less cost of materials) from \$182,375 to \$637,919, or 249.8 per cent.

The number of persons engaged in the industry increased from 267 to 518. This increase, however, was almost entirely the result of an increase in the number of proprietors and firm members, which increased from 76 to 346. In recent years the partnership form of ownership in its several variations has been in great favor, sometimes as many as 30 or 40 persons being interested in a single establishment. The decrease in the number of wage earners is probably due to the increase in the number of proprietors who actually performed services. The largest number of wage earners, 153, was employed in December, and the smallest number, 121, was employed in June. The most active period in the industry was from July to December, though marked activity is shown in March, due to the fact that in each year two crops of rice are produced—one in the spring and one in the fall.

Materials and products.—The census of agriculture in 1909 shows that the production of rough rice in Hawaii was 41,827,900 pounds. Some of this rice was exported, but nearly the entire amount was used for local consumption. Large quantities of foreign rice—practically all of it from Japan—are imported and milled each year. The amount of this foreign rice, which is hulled before importation, treated in Hawaii in 1909 was 28,749,015 pounds. The total production of clean rice in 1909 was 51,967,465 pounds, of which all but 585,904 pounds was whole rice. This large proportion of whole rice may be accounted for, in part, by the fact that very little polishing was done to the grains, with the result that the breakage was only slight. In this regard the practice in Hawaii is very different from that prevalent in the United States, where the trade demands rice which has been highly polished. Bran is practically the only product other than clean rice obtained by the Hawaiian mills, this item amounting to 6,415,232 pounds in 1909.

SALT

THE MANUFACTURE OF SALT.

GENERAL STATISTICS.

Scope of the industry.—The salt industry, as defined by the Census Bureau, covers both establishments engaged in making salt by the evaporation of brine obtained either from subterranean sources by means of wells, from the sea, or from saline springs and lakes, and those which manufacture merchantable salt from natural deposits of rock salt. This latter portion of the business is partly a mining industry, but for the purposes of the census reports it seemed better to combine all branches of the salt industry, without distinguishing between mining and manufacturing. The statistics shown in this report, therefore, cover the work of extracting the crude material from its original source, as well as its subsequent manufacture into the finished product.

Several establishments engaged in the manufacture of soda products use as material salt brine obtained on their own premises, but the returns of such concerns, except as explained in the discussion of Table 10, are included in census statistics with those for the

industry covered by the designation "chemicals." Those establishments whose principal product is salt, but which sell brine to establishments engaged in the manufacture of soda, or make bromine or other chemicals as by-products, are classed with the salt industry and the statistics for such establishments are included in all the tables in this report. In 1849, 340 establishments were reported as engaged in the manufacture of salt, these establishments giving employment to an average of 2,786 hands and turning out products valued at \$2,177,945. In 1859, 399 establishments were reported, employing an average of 2,213 hands and turning out products to the value of \$2,289,504.

Comparison with earlier censuses.—Table 1 summarizes the statistics of the salt industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 1	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	124	146	159	200	268	282	-22.0	-15.1	-8.2	-20.5	-25.4	-5.0
Persons engaged in the industry.....	5,580	5,171	5,261	(²)	(²)	(²)	6.1	7.9	-1.7	.....	.....	.....
Proprietors and firm members.....	74	87	81	(²)	(²)	(²)	-8.6	-14.9	7.4	.....	.....	.....
Salaried employees.....	570	418	406	(²)	(²)	(²)	40.4	36.4	3.0	.....	.....	.....
Wage earners (average number).....	4,936	4,666	4,774	4,255	4,289	2,953	3.4	5.8	-2.3	(³)	(³)	(³)
Primary horsepower.....	27,263	19,434	23,865	11,552	8,476	3,322	14.2	40.3	-18.6	106.6	36.3	155.1
Capital.....	\$29,011,793	\$25,586,282	\$27,123,364	\$13,437,749	\$8,225,740	\$6,561,615	7.0	13.4	-5.7	101.8	63.4	25.4
Expenses.....	9,632,738	7,955,540	6,507,349	4,283,444	(²)	(²)	48.0	21.1	22.3	51.9	.....	.....
Services.....	3,250,176	2,553,824	2,410,888	1,782,491	1,260,023	1,146,910	34.8	27.3	5.9	35.3	41.5	9.9
Salaries.....	718,730	487,425	499,748	(²)	(²)	(²)	43.8	47.5	-2.5	.....	.....	.....
Wages.....	2,531,446	2,066,399	1,911,140	(²)	(²)	(²)	32.5	22.5	8.1	.....	.....	.....
Materials.....	5,208,354	4,166,137	3,335,922	1,826,770	2,074,049	1,760,670	56.0	24.9	24.9	82.6	-11.9	17.8
Miscellaneous.....	1,179,208	1,235,579	760,539	674,183	(²)	(²)	55.0	-4.6	62.5	12.8	.....	.....
Value of products.....	11,327,834	9,437,662	7,966,897	5,484,618	4,829,566	4,818,229	42.2	20.0	18.5	45.3	13.6	0.2
Value added by manufacture (value of products less cost of materials).....	6,124,480	5,271,525	4,630,975	3,657,848	2,755,517	3,057,559	32.2	16.2	13.8	26.6	32.7	-9.9

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available.
³ Figures not strictly comparable.

Table 1 shows that there has been a constant decrease from census to census in the number of establishments engaged in the industry, and, on the other hand, an increase in the value of products, indicating that there has been a marked increase in the average productive capacity of the plants.

In 1909 the value of products was \$11,327,834, of which amount 45.9 per cent represented the cost of materials. Although, as noted in the Introduction, the statistics of capital are not entirely satisfactory, they are of sufficient accuracy to show that the value of products was remarkably small in proportion to the

total capital employed in the industry. The number of wage earners in 1909 was 4,936, an increase for the decade of only 3.3 per cent; the absolute increase was two less than for the salaried employees. The amount paid in wages showed a much greater relative increase (32.5 per cent) than was shown for the number of wage earners (3.3 per cent).

Summary, by states.—Table 2 summarizes the more important statistics by states, the states being arranged according to the value of products reported for 1909. Some states for which data can not be shown separately ranked higher than some named in the table.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.				VALUE ADDED BY MANUFACTURE.				PER CENT OF INCREASE. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.			
							1909	1904				1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909
United States...	124	4,936	100.0	.....	\$11,327,834	100.0	.....	.....	\$8,124,480	100.0	.....	.....	3.4	5.8	-2.2	42.2	20.0	18.5	32.2	18.2	13.8
Michigan.....	27	1,363	27.6	2	3,652,996	32.2	1	2	2,009,646	32.8	1	2	-5.9	-1.8	-4.2	48.5	51.9	-2.3	47.3	65.6	-11.1
New York.....	33	1,525	30.9	1	2,896,826	25.6	2	1	1,701,635	27.8	2	1	19.2	11.1	7.3	7.3	-8.5	17.4	-2.2	-14.1	13.9
Ohio.....	8	843	13.1	3	1,807,347	16.0	3	3	718,992	11.7	3	4	-4.4	20.2	-20.5	120.9	54.8	42.7	81.8	42.0	28.1
Kansas.....	10	451	9.1	4	1,105,920	9.8	4	4	586,666	9.6	4	3	0.2	-14.3	16.9	54.1	-1.5	56.5	50.6	-0.5	51.3
California.....	19	402	8.1	5	746,211	6.6	5	5	503,866	8.2	5	5	50.6	28.4	17.2	96.3	74.1	12.7	91.2	63.1	17.2
Texas.....	6	162	3.3	7	407,160	3.6	6	6	190,707	3.1	6	8	-15.2	-5.8	-9.9	58.5	16.0	36.6	65.0	22.1	35.2
Utah.....	9	56	1.1	9	183,843	1.6	8	8	130,574	2.1	8	7	.....	.....	.....	31.8	-22.4	69.9	21.2	-29.7	72.3
West Virginia.....	3	110	2.2	8	131,414	1.2	9	9	62,265	1.0	9	9	-42.1	.....	-57.9	-12.6	13.6	-23.0	.....	.....	.....
Nevada.....	4	13	0.3	11	23,879	0.2	11	11	17,986	0.3	11	11	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	5	206	4.2	.....	372,238	3.3	.....	.....	204,143	3.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ A minus sign (-) denotes decrease. Percentages are omitted where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture.

The manufacture of salt is a localized industry, being confined to places where the salt brine or deposits of salt are found. It was reported from only 13 states in 1909. Michigan was the leading state in the industry, as measured by value of products and value added by manufacture, but in number of wage earners it was second to New York. In 1904 these conditions were reversed, New York ranking first in value of products and value added by manufacture, and ranking second to Michigan in number of wage earners. The number of wage earners employed in the industry in Michigan decreased 5.9 per cent during the decade ending with 1909, while the value of products increased 48.5 per cent, representing in 1909 almost one-third of the total for the industry. The combined value of the products of the three leading states, Michigan, New York, and Ohio, constituted almost three-fourths of the total for the industry. Of the states shown separately, Ohio and California reported the greatest relative increase in value of products from 1899 to 1909, 120.9 per cent and 96.3 per cent, respectively.

Persons engaged in the industry.—Table 3 shows for 1909 the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and in other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	5,580	5,132	448
Proprietors and officials.....	291	276	15
Proprietors and firm members.....	74	59	15
Salaried officers of corporations.....	94	94	.....
Superintendents and managers.....	123	123	.....
Clerks.....	353	278	77
Wage earners (average number).....	4,936	4,580	356
16 years of age and over.....	4,929	4,575	354
Under 16 years of age.....	7	5	2

The average number of persons engaged in the salt industry during 1909 was 5,580, of whom 4,936, or 88.5 per cent, were wage earners, 291, or 5.2 per cent, were proprietors and officials, and 353, or 6.3 per cent, were clerks, this class including other subordinate salaried employees. Of the total number of persons in the industry, 92 per cent were males and 8 per cent females. Only 7 children were employed as wage earners.

Wage earners employed, by months.—Table 4 gives the number of wage earners employed in the salt industry on the 15th (or nearest representative day) of each month during the year 1909.

MONTH.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	4,340	83.0
February.....	4,462	85.3
March.....	4,846	92.7
April.....	4,977	95.2
May.....	4,984	95.3
June.....	5,132	98.1
July.....	5,229	100.0
August.....	5,198	99.4
September.....	5,192	99.3
October.....	5,158	98.6
November.....	5,070	97.0
December.....	4,636	88.7

In the industry as a whole the largest number of wage earners employed during any month of 1909 was 5,229 in July, and the smallest number, 4,340, in January, the minimum number being equal to 63.9 per cent of the maximum. In 1904 the maximum number was 5,247, in October, and the minimum, 4,023, in February, the latter number being equal to 76.7 per cent of the former.

Prevailing hours of labor.—In Table 5 the wage earners in the salt industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even

though a few employees worked a greater or smaller number of hours.

Table 5

PREVAILING HOURS OF LABOR PER WEEK.

	WAGE EARNERS IN THE INDUSTRY: 1909	
	Average number.	Per cent of total.
Total	4,936	100.0
48 and under.....	214	4.3
54.....	459	9.3
Between 54 and 60.....	135	2.7
60.....	2,991	60.6
Between 60 and 72.....	550	11.1
72.....	431	8.7
Over 72.....	156	3.2

Of the 4,936 wage earners reported for 1909, 2,991, or 60.6 per cent, were employed in establishments where the prevailing hours of labor were 60 per week; 808, or 16.3 per cent, in establishments where the prevailing hours were less than 60 per week; and 1,137, or 23 per cent, in establishments where they were more than 60 per week.

Character of ownership.—Table 6 presents statistics with respect to the character of ownership of the establishments in the salt industry.

Table 6

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	124	146	\$11,327,834	\$9,437,662
Individual.....	25	134	637,438	1,353,921
Firm.....	15	18	344,982	305,801
Corporation.....	84	94	10,345,414	8,777,940
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	20.2	23.3	5.6	3.8
Firm.....	12.1	12.3	3.0	3.2
Corporation.....	67.7	64.4	91.3	93.0

¹ Includes one establishment under an unclassified form of ownership.

The number of establishments under each form of ownership decreased from 1904 to 1909, the relative decrease being greatest for those owned by individuals. In 1909 corporations controlled over two-thirds of the total establishments, and the value of the products of these establishments represented more than nine-tenths of the total for the industry.

Size of establishments.—Table 7 presents statistics for establishments in the salt industry in 1909 and 1904 grouped according to the value of products.

Table 7

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	124	146	\$11,327,834	\$9,437,662
Less than \$5,000.....	29	32	81,444	62,561
\$5,000 and less than \$20,000.....	20	41	205,747	430,155
\$20,000 and less than \$100,000.....	41	45	2,097,195	2,124,420
\$100,000 and less than \$1,000,000.....	34	28	8,943,448	6,820,526
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	23.4	21.9	0.7	0.7
\$5,000 and less than \$20,000.....	16.1	28.1	1.8	4.6
\$20,000 and less than \$100,000.....	33.1	30.8	18.5	22.5
\$100,000 and less than \$1,000,000.....	27.4	19.2	79.0	72.3

In 1909 only 34 of the 124 establishments manufactured products valued at \$100,000 or over, but such establishments reported almost four-fifths (79 per cent) of the total value of products. The average value of products per establishment increased from \$64,642 in 1904 to \$91,354 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$36,106 to \$49,391. The average number of wage earners per establishment shows an increase from 32 in 1904 to 39.8 in 1909.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in the salt industry in 1909 to have been \$9,632,738, distributed as follows: Cost of materials, \$5,203,354, or 54 per cent; wages, \$2,531,446, or 26.3 per cent; salaries, \$718,730, or 7.5 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$1,179,208, or 12.2 per cent.

Engines and power.—Table 1 shows that the total amount of power used increased from 3,322 horsepower in 1869 to 27,263 in 1909. Table 8 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

Table 8

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	478	366	394	27,263	19,434	23,865	100.0	100.0	100.0
Owned.....	397	348	394	26,008	19,028	23,815	95.4	97.9	99.8
Steam.....	345	316	380	24,930	18,169	23,104	91.4	93.5	96.8
Gas.....	51	30	13	782	439	182	2.9	2.2	0.8
Water wheels.....	1	2	1	108	33	8	0.4	0.2	(¹)
Other.....				188	387	521	0.7	2.0	2.2
Rented.....	81	18	(²)	1,255	406	50	4.6	2.1	0.2
Electric.....	81	18	(²)	1,241	196	25	4.5	1.0	0.1
Other.....				14	210	25	0.1	1.1	0.1
Electric motors.	239	37	8	3,425	664	220	100.0	100.0	100.0
Run by current generated by establishment.....	158	19	8	2,184	468	195	63.8	70.5	88.6
Run by rented power.....	81	18	(²)	1,241	196	25	36.2	29.5	11.4

¹ Less than one-tenth of 1 per cent.

² Not reported.

The total primary power used in the salt manufacturing establishments increased 14.2 per cent from 1899 to 1909. In 1909, as in 1904 and 1899, power generated by steam engines constituted more than nine-tenths of the total primary power, although the proportion of such power had decreased from 96.8

per cent in 1899 to 91.4 per cent in 1909. The increased use of rented electric power caused its relative importance to increase from one-tenth of 1 per cent of the total primary horsepower in 1899 to 4.5 per cent in 1909. The number and horsepower of electric motors run by means of current generated in the establishments in the industry also show a decided increase.

Fuel consumed.—Except where salt is produced by solar evaporation of brine in open vats or tanks, fuel is a very important factor in the process of salt manufacture, and Table 9 shows the quantity of each kind of

fuel consumed in the industry in 1909. In 1909 the amount expended for fuel and rent of power, as shown in Table 11, was \$1,590,746.

KIND.	FUEL USED: 1909	
	Unit.	Quantity.
Anthracite coal.....	Long tons.....	108, 816
Bituminous coal.....	Short tons.....	642, 373
Coke.....	Short tons.....	15
Wood.....	Cords.....	9, 441
Oil, including gasoline.....	Barrels.....	85, 074
Gas.....	1,000 feet.....	1, 688, 731

SPECIAL STATISTICS RELATING TO PRODUCTS AND PROCESSES.

Summary for the United States.—Table 10 shows, for 1909, 1904, and 1899, statistics as to the quantity and value of the different products, the grades of salt manufactured, and the processes employed.

PRODUCT.	1909	1904	1899
Total value.....	\$11,327,834	\$9,437,662	\$7,966,897
Salt, including brine:			
Barrels.....	29,933,060	17,128,572	15,187,819
Value.....	\$8,311,729	\$6,956,734	\$5,869,362
Salt—			
Barrels.....	21,162,253	17,128,572	15,187,819
Value.....	\$7,873,189	\$6,956,734	\$5,869,362
Brine (intermediate product in the manufacture of sodas)—			
Barrels.....	8,770,807	(¹)	(¹)
Value.....	\$438,540	(¹)	(¹)
Bromine:			
Pounds.....	569,725	261,665	279,437
Value.....	\$57,600	\$72,584	\$64,921
All other products.....	\$2,958,505	\$2,409,344	\$2,032,614
<i>Salt, classified by grade (barrels).</i>			
Table and dairy.....	3,042,824	3,119,091	1,866,058
Common fine.....	7,745,204	6,254,293	6,866,126
Common coarse.....	2,843,393	1,878,666	2,635,282
Packers.....	385,802	498,943	182,930
Coarse solar.....	1,109,336	1,677,182	910,974
Rock salt, mined.....	5,938,721	3,416,835	2,543,679
Milling, and other grades.....	96,913	283,562	182,770
<i>Processes employed.</i>			
Total number of establishments.....	124	146	159
Number reporting:			
Solar.....	46	63	(¹)
Kettle.....	1	7	(¹)
Grainer.....	50	70	(¹)
Open pan.....	11	12	(¹)
Vacuum pan.....	21	20	(¹)

¹ In addition, salt to the value of \$191,431 was produced in establishments engaged primarily in the manufacture of chemicals, ice, lumber and timber products, and soap.

² In addition, 25,043 barrels of salt, valued at \$8,415, were produced by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

³ Does not include brine.

⁴ Not reported.

⁵ Includes potassium bromide, reduced to the equivalent of bromine.

In order to avoid a duplicate canvass, the United States Geological Survey, which annually collects statistics of the production of salt, and the Bureau of the Census cooperated in collecting data for the year 1909. Excluding the production of salt for Hawaii and Porto Rico, the reports of the two bureaus agree for 1909. The variation in the reports for other census years may be attributed to differences in the methods employed by the two bureaus. These differences, especially in the quantities of the different grades of salt, are sufficient to affect to a certain extent the comparability of the totals for 1909 with those for 1904 and 1899.

The value of salt, as shown in the table, does not include the value of the containers, which is included under "all other products" for each census. The barrel of 280 pounds is used for showing quantities of salt.

The value of all products of the salt industry, according to the statistics shown in Table 10, increased from \$7,966,897 in 1899 to \$11,327,834 in 1909, or 42.2 per cent. The production of salt, not including brine, increased from 15,187,819 barrels in 1899 to 21,162,253 barrels in 1909, or 39.3 per cent.

The grades of salt, the quantity of each of which is shown in Table 10, are described by the United States Geological Survey, in its report for 1909 on salt production,¹ as follows:

For convenience salt is classified according to the grades by which it is sold by the producer, the grades being determined by the amount of refining, the methods employed in refining, and the purposes for which the salt is used. These grades are "table and dairy," "common fine," "common coarse," "packers," "solar," "rock," "milling," "brine," and "other grades." The "table and dairy" salt includes extra fine and fancy grades prepared for family use, and all grades artificially dried, used for butter and cheese making, and such special brands. Under "common fine" salt are included all other grades of fine salt of first quality, not artificially dried, such as those known to the trade as "C. F.," "No. 1 F," "anthracite," etc. "Common coarse" salt includes all grades coarser than "common fine," made by artificial heat, such as "steam coarse," "No. 1 coarse," "pan solar," "G. A.," "Liverpool ground," "C. C.," etc. By "packers" salt is meant those grades prepared for the purpose of curing fish, meats, etc. "Coarse solar" includes all coarse salt made by solar evaporation. "Rock" salt includes all salt mined and shipped without special preparation. "Mill" salt is that used in gold and silver mills, and "other grades" includes all low-grade or No. 2 salt, used in salting cattle and for fertilizers, track purposes, etc. "Brine" includes all salt liquor used in the manufacture of soda ash, sodium bicarbonate, sodium hydrate (caustic soda), and other sodium salts or brine sold without being evaporated to dryness.

The statistics shown in Table 10 concerning the processes employed refer to the methods of evaporating the brine to the required dryness for salt manufacture. They do not apply to establishments producing rock salt, of which there are several in the United States. The solar process of salt manufacture, according to the returns, was used exclusively in

¹ Mineral Resources of the United States, Part II, page 662.

Nevada and New Mexico, largely in California and Utah, and in part in New York and Texas. In all other states in which salt was made from brine, arti-

ficial heat was the only means used for the evaporation of the brine. The grainer process of evaporation was more frequently reported than any other.

DETAILED STATE TABLE.

The principal statistics secured by the census inquiry concerning salt manufacture are presented by states in Table 11, showing for 1909 the number of establishments reporting, the number of persons engaged in

the industry, primary horsepower employed, capital invested, salaries, wages, cost of materials, miscellaneous expenses, value of products, and value added by manufacture.

SALT—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.
								Maximum month.	Minimum month.						
United States...	124	5,580	74	217	276	77	4,936	Jy 5,229	Ja 4,340	4,987	4,622	358	5	2	27,263
California	19	469	22	23	18	4	402	No 519	Fe 313	468	464	4			1,228
Kansas	10	505	3	19	25	7	451	Oc 499	Ja 387	462	443	19			3,387
Michigan	27	1,567	12	57	98	37	1,363	Je 1,463	Ja 1,200	1,288	1,204	84			6,628
Nevada	4	17	2	2			13	Se 16	Fe 10	11	10	1			82
New York	33	1,686	20	59	72	10	1,525	Au 1,877	Ja 1,274	1,507	1,356	151			9,923
Ohio	8	722		23	36	15	648	Ja ¹ 675	Au 609	677	596	80	1		4,034
Texas	6	181	3	11	4	1	162	Se 181	Ja 142	163	150	11	2		447
Utah	9	75	7	9	3		56	Jy 103	Ja 14	80	74	6			474
West Virginia	3	123	1	5	5	2	110	No 120	Au 91	116	116				335
All other states ²	5	235	4	9	15	1	206			215	209	2	2	2	725

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.			Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.			
United States ..	\$29,011,793	\$9,632,738	\$423,107	\$295,623	\$2,531,446	\$1,590,746	\$3,812,608	\$39,755	\$109,970	\$122,407	\$907,076	\$11,327,834	\$8,124,480	
California	2,022,663	579,661	34,960	20,670	211,672	26,925	215,420	21,675	3,656	950	43,733	746,211	503,866	
Kansas	2,544,199	926,008	49,940	30,366	188,123	170,092	349,162		13,547	17,801	106,977	1,105,920	586,666	
Michigan	5,166,679	3,058,708	92,050	105,414	745,401	555,244	1,088,106		38,277	32,899	401,317	3,652,996	2,009,646	
Nevada	38,174	16,289	2,220		7,644	542	5,351		282		250	23,879	17,986	
New York	14,552,287	2,467,250	143,440	85,214	765,132	416,178	779,013		35,157	52,716	190,400	2,896,826	1,701,635	
Ohio	1,980,873	1,640,212	45,650	32,144	360,534	250,292	840,063		8,791		102,738	1,807,347	716,992	
Texas	506,222	338,404	14,447	3,634	81,908	92,582	123,871	1,500	3,544	5,544	11,374	407,160	190,707	
Utah	837,975	144,394	15,400	3,820	37,535	13,352	39,917	900	1,138	12,497	19,835	183,843	130,574	
West Virginia	150,934	126,732	6,000	3,540	45,533	27,632	41,517		1,325		1,185	131,414	62,265	
All other states ²	1,211,787	335,080	19,000	10,821	87,964	37,907	130,188	15,680	4,253		29,267	372,238	204,143	

¹ Same number reported for one or more other months.

² All other states embrace: Idaho, 1 establishment; Louisiana, 2; New Mexico, 1; Pennsylvania, 1.

THE SUGAR INDUSTRY

THE SUGAR INDUSTRY.

Summary for the three industries combined: 1909.— Table 1 presents a summary of the more important statistics for the sugar industries as a group for 1909. The establishments in the group constitute three industries, designated in the census statistics of manufactures as “beet sugar,” “sugar and molasses,” and “sugar refining, not including beet sugar.” The sugar industry includes establishments manufacturing sugar or sirup from sugar cane, except that the product of mills located on farms and using only the cane grown on the farms where they are situated has been included in the statistics of agriculture. In the aggregate large quantities of sugar cane are crushed in these small farm mills, but the output is practically all sirup, so that the omission of their sugar product does not appreciably affect the statistics relating to the total production of cane sugar in the United States. The sugar refining industry comprises only those establishments which were engaged exclusively (or practically so) in the refining of cane sugar. There is some duplication in the cost of materials and the value of products shown for the three industries combined, by reason of the fact that a large part of the raw sugar, which constitutes the principal product of the “sugar and molasses” branch, is used as material by the refineries. Of the total amount of cane sugar refined, however, by far the larger part is imported.

ufacture of sugar from beets, 214 in the manufacture of sugar or sirup from cane, and 19 in the refining of cane sugar. The total number of persons engaged in these three industries was 24,047, of whom 34.9 per cent were employed in the beet sugar factories, 22.1 per cent in the cane mills, and 43 per cent in the refineries. Although large mills with expensive equipment are required for the manufacture of sugar from beets, it may be stated that in a number of cases the value of the land on which the beets were grown, being owned by the companies, was included in the capital reported. On the other hand, many of the mills which manufacture sugar from cane (“sugar and molasses”) are comparatively small and without very expensive machinery. It should be noted also that the greater part of the beet sugar produced is refined, whereas the sugar from the cane mills is largely raw sugar. The cane sugar refineries, although few in number, have very expensive plants and require a large capital investment, the capital reported averaging over \$6,000,000 per establishment. The processes used in the sugar refining branch are comparatively simple, however, and the value added by manufacture in this industry formed only 9 per cent of the value of products, as compared with 43.3 per cent in the beet sugar industry, and 30.5 per cent in the cane sugar industry (“sugar and molasses”).

The quantity of beet sugar reported in 1909 was 501,682 tons, valued at \$45,937,629, and that of cane sugar 326,858 tons, valued at \$26,095,673. The quantity of refined sugar turned out by the refineries, which would include the product made from foreign raw sugar as well as from domestic cane sugar, was not reported. In both the beet sugar industry and the industry producing raw cane sugar the value of sugar manufactured represents by far the greater part of the total value of products, the value of other products representing only 4.5 per cent of the total in the beet sugar industry, and 14.8 per cent in the sugar and molasses industry, the higher percentage in the latter case being due to the considerable amount of molasses and sirup reported as a product.

According to the census of agriculture, the farm production of sugar and sirup in 1909 amounted to 125,647 pounds of cane sugar, 14,060,206 pounds of maple sugar, 21,633,579 gallons of cane sirup, 16,532,000 gallons of sorghum, and 4,106,418 gallons of maple sirup. In this connection attention is called to the fact that the glucose factories produced, in 1909, 769,660,210 pounds of glucose, valued at \$17,922,514, and 159,060,478 pounds of grape sugar, valued at \$3,620,816.

Table 1

	THE SUGAR INDUSTRIES COMBINED: 1909			
	Total	Beet-sugar industry.	Cane sugar and molasses industry.	Cane sugar refining industry.
Number of establishments.....	291	58	214	19
Persons engaged in the industry.....	24,047	8,389	5,313	10,345
Proprietors and firm members.....	205	1	198	6
Salaried employees.....	3,112	1,184	988	940
Wage earners (average number).....	20,730	7,204	4,127	9,399
Primary horsepower.....	217,805	57,202	122,189	38,414
Capital.....	\$282,795,499	\$129,628,938	\$37,925,770	\$115,240,791
Expenses.....	\$304,831,067	\$37,353,066	\$26,165,526	\$241,312,475
Services.....	\$16,453,198	\$6,577,900	\$2,600,172	\$7,275,126
Salaries.....	\$4,161,030	\$1,769,454	\$737,421	\$1,654,155
Wages.....	\$12,292,168	\$4,808,446	\$1,862,751	\$5,620,971
Materials.....	\$274,847,974	\$27,265,170	\$21,294,844	\$226,287,960
Miscellaneous.....	\$13,529,895	\$3,509,996	\$2,270,510	\$7,749,389
Value of products.....	\$327,371,780	\$48,122,383	\$30,620,738	\$248,628,659
Value added by manufacture (value of products less cost of materials).....	\$52,523,806	\$20,857,213	\$9,325,894	\$22,340,699
Sugar manufactured:				
Quantity (tons).....	(1)	501,682	326,858	(2)
Value.....	(1)	\$45,937,629	\$26,095,673	(2)

¹ Figures for the total quantity of sugar manufactured are not available. The combined output of the beet sugar industry and the sugar and molasses industry, which is approximately equal to the total production of domestic sugar, was 828,529 tons, valued at \$72,033,302.

² Not reported.

There were 291 establishments in the United States engaged in the manufacture and refining of sugar and sirup in 1909. Of these, 58 were engaged in the man-

THE BEET SUGAR INDUSTRY.

Scope of the industry.—This industry includes all establishments making sugar from sugar beets. The work done includes not only the extraction of the sugar from the beets, but the refining of the greater part of the sugar, a fact which should be borne in mind in comparing the statistics for the beet sugar industry with those for the cane sugar and molasses industry, in which the processes of manufacturing do not include the refining of the raw sugar produced.

Comparative summary.—Table 2 summarizes the statistics of the beet sugar industry in the United States for the censuses of 1909, 1904, and 1899. It also presents the statistics for 1904 and 1909 for three groups of states.

Except for the state of Michigan, it is impossible to publish statistics for the beet sugar industry by states without disclosing the operations of individual establishments. For this reason, and also to permit of a more detailed presentation of the statistics, the states

have been arranged in three groups, a method of presentation which, in addition to preventing the disclosure of individual operations, brings under the same heading factories operated to a greater or less extent under similar conditions. Group I includes Arizona, California, Oregon, and Washington. In Arizona, and to a less degree in the other states of this group, the growers of beets depend upon irrigation, and, as a rule, planting and harvesting are earlier in these states than elsewhere in this country. Group II is made up of the states of Colorado, Idaho, Kansas, Montana, Nebraska, and Utah. In this group also the beets are grown almost entirely upon irrigated land. Group III includes the remaining states in the industry—Illinois, Iowa, Michigan, Minnesota, New York, Ohio, and Wisconsin. While the conditions in this group are not so uniform as are those in the other two, they have this feature in common, that the beets are grown on nonirrigated land.

Table 2

	BEET SUGAR INDUSTRY.														
	Number or amount.									Per cent of increase. ¹					
	United States.			Group I. ²		Group II. ³		Group III. ⁴		United States.			Grp. I.	Grp. II.	Grp. III.
	1909	1904	1899	1909	1904	1909	1904	1909	1904	1909	1904	1899-1909	1904-1909	1899-1904	1904-1909	1904-1909
Number of establishments.....	58	51	30	12	7	26	19	20	25	93.3	13.7	70.0	71.4	36.8	20.0
Persons engaged in the industry.....	8,389	4,726	2,321	2,173	782	3,888	1,972	2,328	1,972	261.6	77.5	103.6	177.9	97.2	18.1
Proprietors and firm members.....	1	1	1	1	1	1	1	1	1	.....	.....	.....	.....	.....	.....
Salaried employees.....	1,184	763	350	265	112	493	294	426	357	238.3	55.2	118.0	136.6	67.7	19.3
Wage earners (average number).....	7,204	3,963	1,970	1,908	670	3,395	1,678	1,901	1,615	265.7	81.8	101.2	184.8	102.3	17.7
Primary horsepower.....	57,202	35,490	14,460	13,551	11,411	30,149	13,248	13,502	10,831	295.6	61.2	145.4	15.8	127.6	24.7
Capital.....	\$129,628,938	\$55,923,459	\$20,141,719	\$37,629,771	\$12,013,286	\$64,236,216	\$27,067,559	\$27,762,951	\$16,842,614	543.6	131.8	177.6	213.2	137.3	64.8
Expenses.....	\$37,353,066	\$19,977,769	\$6,094,062	\$8,728,732	\$3,659,455	\$17,336,908	\$9,145,603	\$10,787,428	\$7,142,711	458.0	87.0	198.4	136.6	95.0	51.0
Services.....	\$6,577,900	\$3,491,338	\$1,448,832	\$1,750,621	\$649,818	\$3,115,763	\$1,633,278	\$1,711,516	\$1,208,242	354.0	88.4	141.0	169.4	90.8	41.7
Salaries.....	\$1,769,454	\$1,004,636	\$356,675	\$453,666	\$151,630	\$769,307	\$415,479	\$546,481	\$407,527	396.1	76.1	181.7	149.8	85.2	34.1
Wages.....	\$4,808,446	\$2,486,702	\$1,092,207	\$1,296,955	\$468,188	\$2,346,456	\$1,217,799	\$1,165,035	\$800,715	340.3	93.4	127.7	177.0	92.7	45.5
Materials.....	\$27,265,170	\$14,486,876	\$4,803,796	\$6,198,751	\$2,710,398	\$13,241,896	\$6,727,004	\$7,824,524	\$5,049,474	467.6	88.2	201.6	128.7	96.8	55.0
Miscellaneous.....	\$3,509,996	\$1,999,553	\$441,384	\$779,300	\$329,239	\$1,479,250	\$785,321	\$1,251,386	\$884,995	695.2	75.5	353.0	136.7	88.4	41.4
Value of products.....	\$48,122,383	\$24,393,794	\$7,323,857	\$12,499,279	\$4,830,446	\$22,651,903	\$12,034,599	\$12,971,201	\$7,528,749	557.1	97.3	233.1	158.8	88.2	72.3
Value added by manufacture (value of products less cost of materials).....	\$20,857,213	\$9,906,918	\$2,520,061	\$6,300,528	\$2,120,048	\$9,410,008	\$5,307,595	\$5,146,677	\$2,479,275	727.6	110.5	293.1	197.2	77.3	107.6
Beets used (tons).....	3,965,356	2,175,417	794,658	901,855	442,892	2,036,437	1,010,202	1,027,064	722,323	399.0	82.3	173.8	103.6	101.6	42.2
Sugar produced:															
Tons.....	501,682	253,921	81,729	131,605	50,432	241,333	120,623	128,744	82,866	513.8	97.6	210.7	161.0	100.1	55.4
Value.....	\$45,937,629	\$23,924,602	\$7,222,581	\$12,216,616	\$4,720,002	\$21,631,709	\$11,809,557	\$12,089,304	\$7,395,043	536.0	92.0	231.2	158.8	83.2	63.5

¹ A minus sign (-) denotes decrease.
² Group I embraces Arizona, 1 establishment; California, 9; Oregon, 1; Washington, 1.
³ Group II embraces Colorado, 15 establishments; Idaho, 3; Kansas, 1; Montana, 1; Nebraska, 1; Utah, 5.
⁴ Group III embraces Illinois, 1 establishment; Iowa, 1; Michigan, 11; Minnesota, 1; New York, 1; Ohio, 1; Wisconsin, 4.

In 1909 there were 3 companies which operated 2 or more factories located in the same state, the plants under their control, 10 in all, being reported as 3 establishments. There were, therefore, 65 separate factories in operation during 1909, and in addition 3 were reported as idle during the entire year.

The manufacture of beet sugar is an industry of comparatively recent development in the United States. At the census of 1869, 2 establishments, with 116 wage earners and products valued at \$119,720, were reported under the heading of "sugar and molasses, beet and grape," the greater part of the product doubtless being beet sugar. The industry

was first shown separately in the reports for the census of 1879, when there were 4 establishments, giving employment to 350 wage earners and having products valued at \$282,572. In 1889 but 2 establishments were reported and the statistics for the industry could not be presented without disclosing the operations of individual establishments. In 1899 there were 30 establishments, with products valued at \$7,323,857, and in 1909, 58 establishments, with products valued at \$48,122,383. During the decade ending with 1909 the value of products increased 557.1 per cent, the increase during the five years from 1899 to 1904 being 233.1 per cent, as compared with 97.3 per cent for the

last half of the decade. The absolute increase, however, was larger during the later period than during the earlier. The value of products is made up almost entirely of the value of sugar, the molasses, beet pulp, and other by-products being of relatively little importance. The quantity of beets used increased during the decade from 794,658 tons to 3,965,356 tons, or 399 per cent, and the quantity of sugar manufactured from 81,729 tons to 501,682 tons, or 513.8 per cent.

Of the 58 establishments reporting for 1909, 12 were in the states of Group I, 26 in those of Group II, and 20 in those of Group III. The actual number of active factories in each of these groups, however, was 13, 27, and 25, respectively. The factories in the states of Group I employed 26.5 per cent of the total number of wage earners in the industry; those in the states of Group II, 47.1 per cent; and those in the states of Group III, 26.4 per cent. Of the total value of products, Group I reported 26 per cent; Group II, 47.1 per cent; and Group III, 27 per cent. The distribution of the value added by manufacture is somewhat different, Group I showing 30.2 per cent of the total; Group II, 45.1 per cent; and Group III, 24.7 per cent. The higher ratio between value added by manufacture and value of products in Group I is accounted for in part by the fact that the beets used in the factories of this group in 1909 were of a higher quality than those used in the other groups.

Capacity of establishments.—The growth of the industry is further illustrated by Table 3, which has been compiled from unofficial but reliable sources. The table shows for each state the total number of factories and their total daily slicing capacity for the years 1909, 1904, and 1899.

STATE.	1909 ¹		1904 ²		1899	
	Number of factories.	Daily capacity (tons of beets).	Number of factories.	Daily capacity (tons of beets).	Number of factories.	Daily capacity (tons of beets).
United States....	368	52,750	51	35,800	431	19,110
Arizona.....	1	800				
California.....	411	11,700	5	7,300	8	9,900
Colorado.....	16	12,200	9	6,350	1	350
Idaho.....	4	3,750	3	1,800		
Illinois.....	1	350			1	700
Iowa.....	1	500				
Kansas.....	1	1,200				
Michigan.....	17	11,900	19	12,550	9	4,100
Minnesota.....	1	600	1	400	1	400
Montana.....	1	1,200				
Nebraska.....	1	350	3	1,200	3	1,260
New Mexico.....					1	200
New York.....	1	600	1	600	2	400
Ohio.....	1	400	1	400		
Oregon.....	1	400	1	350	1	350
Utah.....	5	4,000	4	2,850	3	1,100
Washington.....	1	500	1	400	1	350
Wisconsin.....	4	2,300	3	1,700		

¹ The American Sugar Industry and Beet Sugar Gazette, January, 1910.
² Willett & Gray's Weekly Statistical Sugar Trade Journal.
³ Includes 3 idle factories.
⁴ Includes 1 idle factory.

The list of states having beet sugar factories in 1909 includes five that do not appear in the list of 1904 and seven not represented in that of 1899, while one state, New Mexico, is shown only for 1899. The total daily slicing capacity of the factories in 1909 was

52,750 tons, as compared with 35,900 tons in 1904 and 19,110 tons in 1899, the increase during the decade being 176 per cent. Based on the daily slicing capacity of their mills, as reported for 1909, the three leading states in the beet sugar industry are Colorado, Michigan, and California, in the order named. These states reported a combined slicing capacity equal to 67.9 per cent of the total for the United States, which is about the same as their proportion of the total number of factories.

Persons engaged in the beet sugar industry.—Table 4 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and, in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE BEET SUGAR INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	8,389	8,281	108
Proprietors and officials.....	320	320	
Proprietors and firm members.....	1	1	
Salaried officers of corporations.....	91	91	
Superintendents and managers.....	228	228	
Clerks.....	865	772	93
Wage earners (average number).....	7,204	7,189	15
16 years of age and over.....	7,198	7,183	15
Under 16 years of age.....	6	6	

The average number of persons engaged in the beet sugar industry during 1909 was 8,389, of whom 7,204, or 85.9 per cent, were wage earners; 320, or 3.8 per cent, proprietors and officials; and 865, or 10.3 per cent, clerks, this class including other subordinate salaried employees. Of the few females employed, practically the entire number were clerks. The proportions which the three classes represent of the total number of persons engaged in the industry are practically the same in the three groups as for the industry as a whole.

Wage earners employed, by months.—Table 5 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909.

MONTH.	WAGE EARNERS EMPLOYED IN THE BEET SUGAR INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	6,465	38.5
February.....	2,206	13.1
March.....	2,750	16.4
April.....	3,057	18.2
May.....	3,432	20.4
June.....	3,943	23.5
July.....	4,505	26.8
August.....	6,045	36.0
September.....	7,215	42.9
October.....	15,815	94.1
November.....	18,807	100.0
December.....	14,233	84.7

Because the best results are obtained by utilizing the crop promptly, the beet sugar industry is a seasonal one, exhibiting a wide divergence in the numbers of wage earners for the several months. The minimum number in 1909 was reported for February, when 2,206 wage earners, equal to only 13.1 per cent of the maximum for the year, were employed. During the "campaign," as the active period in the sugar industry is termed, nearly all the factories were operated continuously, the wage earners working in shifts of from 11½ to 12 hours each, seven days in the week. With the exception of two states, the busy season for the industry covers the three months of October, November, and December, the months immediately following the beet harvest. In Arizona the campaign begins in June, and in California in August.

Character of ownership and size of establishment.—With a single exception, all of the beet sugar factories are owned by corporations. Only 2 of the establishments reported a value of products amounting to less than \$100,000, while 42 reported a value in excess of \$100,000 but less than \$1,000,000, and 14 a value in excess of \$1,000,000. This last group gave employment to an average of 3,430 wage earners, or 47.6 per cent of the total for the industry.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in the beet sugar industry in 1909 to have been \$37,353,066, distributed as follows: Cost of materials, \$27,265,170, or 73 per cent; wages, \$4,808,446, or 12.9 per cent; salaries, \$1,769,454, or 4.7 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, traveling expenses, and other sundry expenses, \$3,509,996, or 9.4 per cent.

Engines and power.—Table 6 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary horsepower used in the beet sugar factories at the census of 1909 was 57,202, as compared with 35,490 in 1904, and 14,460 in 1899, almost the en-

tire amount at each census being steam power. The amount of rented electric power increased from 5 horsepower in 1904 to 2,090 in 1909, while the horsepower of electric motors used for the distribution of power by means of current generated in the same establishment also shows a marked increase for the decade.

Table 6

POWER.	BEET SUGAR INDUSTRY.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	807	347	145	57,202	35,490	14,460	100.0	100.0	100.0
Owned.....	716	345	145	55,112	35,485	14,460	96.3	100.0	100.0
Steam.....	679	274	142	54,369	35,016	14,442	95.0	98.7	99.9
Gas.....	26	7	3	543	40	18	0.9	0.1	0.1
Water wheels and motors.....	11	64	.....	200	429	.....	0.3	1.2	.....
Rented—Electric..	91	2	.....	2,090	5	.....	3.7	(?)	.....
Electric motors.	388	186	45	8,868	4,702	2,388	100.0	100.0	100.0
Run by current generated by establishment.....	297	184	45	6,778	4,697	2,388	76.4	99.9	100.0
Run by rented power.....	91	2	.....	2,090	5	.....	23.6	0.1	.....

¹ Less than one-tenth of 1 per cent.

Fuel consumed.—In the beet sugar industry the kind of fuel used depends very largely on the locality. In California, Arizona, and Kansas practically all the fuel used was oil, while in the other states it was largely bituminous coal, although some anthracite coal was used in Michigan and some wood in Oregon.

SPECIAL STATISTICS RELATING TO ACREAGE PLANTED, MATERIALS, AND PRODUCTS.

Acreage planted and beets used.—The special schedule used in collecting the statistics for the beet sugar industry required a detailed statement regarding the quantity of beets used and the acreage planted to beets, and of the quantity and value of the different products manufactured. Table 7 gives the acreage planted to beets, the quantity of beets used in the manufacture of sugar, the average percentage of sucrose, and the average coefficient of purity for the United States, as reported for the years 1909, 1904, and 1899, and for the three groups of states separately, as reported for 1909 and 1904.

Table 7

	BEET SUGAR INDUSTRY.									
	United States.			Group I. ¹		Group II. ²		Group III. ³		
	1909	1904	1899	1909	1904	1909	1904	1909	1904	
Total acreage of beets planted	415,964	240,757	135,305	86,094	38,257	198,816	97,102	131,054	105,398	
By proprietors of factories.....	29,459	20,484	10,239	21,511	6,169	6,899	6,622	1,249	7,693	
By tenants of factories.....	18,166	20,223	13,074	10,362	9,537	7,804	3,753	.....	6,933
By independent growers.....	368,339	200,050	111,992	54,221	22,551	184,313	86,727	129,805	90,772	
Total quantity of beets treated, tons	3,965,358	2,175,417	794,658	901,855	442,882	2,036,437	1,010,202	1,027,064	722,323	
Grown by proprietors.....	266,768	169,839	23,241	206,858	65,274	52,158	63,127	7,752	41,438	
Grown by tenants.....	163,843	210,247	95,071	101,885	114,353	61,958	38,239	.....	57,655
Grown by independent growers.....	3,534,745	1,795,331	676,346	593,112	263,265	1,922,321	908,836	1,019,312	623,230	
Quality of beets used:										
Average percentage of sucrose.....	16.1	15.0	14.3	18.0	15.1	15.1	15.5	16.6	14.4	
Average coefficient of purity.....	84.1	83.2	81.2	84.8	82.3	83.1	83.4	85.8	84.2	

¹ Group I embraces Arizona, 1 establishment; California, 9; Oregon, 1; Washington, 1.
² Group II embraces Colorado, 15 establishments; Idaho, 3; Kansas, 1; Montana, 1; Nebraska, 1; Utah, 5.
³ Group III embraces Illinois, 1 establishment; Iowa, 1; Michigan, 11; Minnesota, 1; New York, 1; Ohio, 1; Wisconsin, 4.

The total number of acres planted to beets for factory use in 1909 was 415,964. Of these, 29,459 acres, or 7.1 per cent, were planted directly by factories; 18,166 acres, or 4.4 per cent, by tenants of factories; and 368,339 acres, or 88.6 per cent, by independent growers. The total quantity of beets used in the industry was 3,965,356 tons. Of this total, 266,768 tons, or 6.7 per cent, were grown directly by the manufacturing establishments; 163,843 tons, or 4.1 per cent, by tenants of these establishments; and 3,534,745 tons, or 89.1 per cent, by independent growers. In the past some beet sugar manufacturers have found it necessary, in order to assure a supply of beets sufficient for the economical operation of their factories, to purchase or lease farm land and either cultivate it themselves or sublet it for beet growing. The proportion of the total acreage of sugar beets controlled by the manufacturers, however, was considerably smaller in 1909 than in 1904 or 1899.

The production of sugar beets in 1909, as returned on the farm schedules, was 3,932,857 tons, which was 32,499 tons less than the quantity returned on the manufacturers' schedules. This slight difference may be due to a number of causes, among others, to the reporting of sugar beets, in some instances, under the heading of root forage crops on the farm schedule.

The average yield of beets per acre for the United States in 1909 was 9.5 tons. The highest average shown by any single report was 22.5 tons, the area yielding that average being 13 acres located in Utah, owned and operated by a beet sugar establishment. Yields as low as 5 tons per acre were reported by some of the establishments in each of the three groups.

The increase for the decade in the total area planted covered by the table was 280,659 acres, or 207.4 per cent. For the five-year period 1904-1909 the increase was 175,207 acres, or 72.8 per cent. The increase in the states of Group I during the five-year period amounted to 125 per cent, that in the states of Group II to 104.7 per cent, and that in the states of Group III to 24.3 per cent.

The total production of beets for any specified year depends very much upon weather conditions, and consideration must be given to this fact in drawing conclusions from comparisons between the figures for different years. The figures in the table do not purport to show the production of sugar beets in the country, but only the quantity used in the manufacture of beet sugar. In 1909 some fields which had produced well were caught by an early frost and the crop was either entirely abandoned or only partially harvested. In spite of this fact the average tonnage of beets per acre planted in the United States shows an increase of half a ton over the figure for 1904, indicating the efficiency of improved methods of cultivation.

The quality of the sugar beet is indicated by the "percentage of sucrose" and the "coefficient of purity." Both these terms relate to the sugar content, the former being the ratio of the weight of sugar to the weight of the whole beet, and the latter the ratio of sugar to the solid content of the beet.

As shown in the table, the average percentage of sucrose for the United States was 16.1 in 1909, as compared with 15 per cent in 1904 and 14.3 per cent in 1899. These percentages show a steady increase in the sugar content of the beets produced. Considerable variation in quality of beets is shown for the different localities, the average sugar content in the states of Group I being 18 per cent; in those of Group II, 15.1 per cent; and in those of Group III, 16.6 per cent. In the operation of the beet sugar factory the coefficient of purity of the beets used is of great importance, as upon this depends to a considerable extent the cost of the separation of the sugar from the other solids. The average for the United States was 84.1 per cent in 1909, as compared with 83.2 per cent in 1904, and 81.2 per cent in 1899. The coefficient of purity for the states of Group I was 84.8 per cent; for those of Group II, 83.1 per cent; and for those of Group III, 85.8 per cent. The total sugar content of the 3,965,356 tons of beets used in 1909, based on the average of 16.1 per cent, was 638,422

tons. The amount of sugar manufactured, however, according to the returns, was only 501,682 tons, or 78.6 per cent of the theoretically possible total. Thus more than one-fifth of the total sugar content of the beets did not reach the form of sugar. This difference represents the loss from deterioration in the beets before being used, the loss in the various processes of manufacture, and the amount left in the pulp and in the residual molasses.

Methods of payment for beets purchased.—Two methods are employed in determining the price to be paid for the beets purchased by the sugar factories. One is the payment of a fixed price per ton, with a proviso, in some instances, that the beets must average not less than a certain percentage of sucrose. The other is the sliding scale, where a stipulated price is paid for beets analyzing a specified percentage of sucrose, with an added amount for every additional per cent or a fraction of a per cent of sucrose.

Of the 65 factories operated by the 58 establishments reporting for 1909, 30 purchased their entire supply of beets on the fixed-price basis and 8 on the sliding-scale basis, while 27 used both methods, the reports indicating that about two-thirds of the total quantity of beets

were purchased on the first basis. Where the sliding scale was used in the purchase of beets, \$4.50 per ton for beets analyzing 12 per cent sucrose was, in most instances, the basis, 33½ cents per ton being added for every additional per cent of sucrose. In the states comprising Groups I and II nearly the entire supply of beets was purchased on the fixed-price basis, while in those of Group III the sliding-scale basis was most generally used.

Products.—In the early history of the beet sugar industry in the United States, sugar was the only product of commercial value, but with the development of the industry attention has been paid to the utilization of the by-products. The few factories reporting no value for the pulp and molasses produced in 1909 generally returned these by-products to the producers of the beets, probably with some concession in the price paid for the beets, or as an additional inducement for their cultivation.

Table 8 shows the quantity and value of the different products manufactured in 1909, 1904, and 1899 for the United States, and the quantity and value of the different products in 1909 and 1904 for the three groups of states separately.

PRODUCT.	BEET SUGAR INDUSTRY.								
	United States.			Group I. ¹		Group II. ²		Group III. ³	
	1909	1904	1899	1909	1904	1909	1904	1909	1904
Total value	\$48,122,383	\$24,393,794	\$7,323,857	\$12,499,279	\$4,830,446	\$22,651,903	\$12,034,699	\$12,971,201	\$7,523,749
Sugar:									
Quantity (tons).....	501,682	253,922	81,729	131,605	50,432	241,332	120,624	128,745	82,866
Value.....	\$45,937,629	\$23,924,602	\$7,222,581	\$12,216,616	\$4,720,002	\$21,631,709	\$11,809,657	\$12,089,304	\$7,395,043
Granulated—									
Quantity (tons).....	496,807	248,309	57,943	131,218	49,702	237,640	117,966	127,949	80,641
Value.....	\$45,645,810	\$23,493,373	\$5,580,527	\$12,197,526	\$4,668,086	\$21,420,196	\$11,607,353	\$12,028,088	\$7,217,984
Raw—									
Quantity (tons).....	4,875	5,613	23,886	387	730	3,692	2,658	796	2,225
Value.....	\$291,819	\$431,229	\$1,642,054	\$19,090	\$51,916	\$211,513	\$202,204	\$61,216	\$177,109
Molasses:									
Quantity (gallons).....	20,812,747	9,809,542	43,551,856	2,715,776	2,994,500	11,563,537	4,693,993	6,533,434	1,921,049
Value.....	\$1,129,905	\$221,097	\$25,102	\$95,790	\$62,491	\$583,130	\$105,223	\$450,985	\$53,383
Pulp.....	\$795,900	\$202,070	\$21,822	\$66,723	\$37,152	\$305,202	\$91,569	\$423,975	\$73,349
All other products.....	\$258,949	\$46,025	\$54,352	\$120,150	\$10,801	\$131,862	\$28,250	\$6,937	\$6,974

¹ Group I embraces Arizona, 1 establishment; California, 9; Oregon, 1; Washington, 1.

² Group II embraces Colorado, 15 establishments; Idaho, 3; Kansas, 1; Montana, 1; Nebraska, 3; Utah, 5.

³ Group III embraces Illinois, 1 establishment; Iowa, 1; Michigan, 11; Minnesota, 1; New York, 1; Ohio, 1; Wisconsin, 4.

⁴ Includes quantities for which no value was given.

The total production of beet sugar in the United States in 1909 was 501,682 tons, of which the states of Group I reported 26.2 per cent; those of Group II, 48.1 per cent; and those of Group III, 25.7 per cent. The average quantity of sugar obtained per ton of beets used in the United States in 1909 was 253 pounds, as compared with 233 pounds in 1904, and 206 in 1899. The corresponding figures for the three groups of states for 1909 and 1904, respectively, were as follows: For Group I, 292 pounds and 228 pounds; for Group II, 237 pounds and 239 pounds; and for Group III, 251 pounds and 229 pounds. It thus appears that in

general not only was the greatest amount of sugar obtained from beets containing the highest percentage of sucrose, but also a larger percentage of the sugar content was recovered, showing the desirability of securing beets that will test as high in sucrose as possible. For this reason those engaged in the industry have found it fully as much to their advantage to direct their attention to the improvement of the beet as to the improvement of methods of sugar extraction. Molasses and pulp, the other important products of the industry, are used largely in the preparation of stock feed.

DETAILED STATISTICS FOR THE THREE GROUPS OF STATES.

The principal statistics secured by the census inquiry of 1909 concerning the beet sugar factories are presented for the United States and the several groups of

states in Table 9, which gives the number of establishments, the number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, miscellaneous expenses, value of products, and value added by manufacture.

BET SUGAR—DETAILED STATISTICS: 1909.

Table 9	United States.	Group I. ¹	Group II. ²	Group III. ³	United States.	Group I. ¹	Group II. ²	Group III. ³	
Number of establishments..	58	12	26	20	Primary horsepower.....	57,202	13,651	30,149	13,502
Persons engaged in the industry.....	8,389	2,173	3,888	2,328	Capital.....	\$129,628,938	\$37,629,771	\$64,236,216	\$27,762,951
Proprietors and firm members.....	1			1	Expenses.....	37,353,066	8,728,732	17,836,908	10,787,426
Salaried officers, superintendents, and managers.....	319	73	156	90	Services.....	6,577,900	1,750,621	3,115,763	1,711,516
Clerks.....	865	192	337	336	Officials.....	1,007,490	251,148	469,178	287,164
Male.....	772	162	312	298	Clerks.....	761,964	202,518	300,129	259,317
Female.....	93	30	25	38	Wage earners.....	4,808,446	1,296,955	2,346,456	1,165,035
Wage earners:					Materials.....	27,265,170	6,198,751	13,241,895	7,824,524
Average number.....	7,204	1,908	3,395	1,901	Fuel and rent of power.....	1,899,468	430,010	958,613	610,845
Number 15th day of month—					Other.....	25,365,702	5,768,741	12,283,282	7,313,679
Maximum number—					Miscellaneous.....	3,509,996	779,360	1,479,250	1,251,386
October.....		3,552			Rent of factory.....	126,082	10,410	80,000	35,672
November.....	16,807		8,365	6,076	Taxes, including internal revenue.....	508,029	112,218	284,417	111,394
Minimum number—					Contract work.....	1,591			1,591
February.....	2,206	797	1,027	382	Other.....	2,874,294	656,732	1,114,833	1,102,729
Wage earners—Dec. 15, or nearest representative day.....	15,736	2,316	7,777	5,643	Value of products.....	48,122,383	12,499,279	22,651,903	12,971,201
16 years of age and over.....	15,722	2,308	7,771	5,643	Value added by manufacture (value of products less cost of materials).....	20,857,213	6,300,528	9,410,008	5,146,677
Male.....	15,690	2,300	7,760	5,630					
Female.....	32	8	11	13					
Under 16 years of age.....	14	8	6						
Male.....	14	8	6						
Female.....									

¹ Group I embraces Arizona, 1 establishment; California, 9; Oregon, 1; Washington, 1.
² Group II embraces Colorado, 15 establishments; Idaho, 3; Kansas, 1; Nebraska, 1; Montana, 1; Utah, 5.
³ Group III embraces Illinois, 1 establishment; Iowa, 1; Michigan, 11; Minnesota, 1; New York, 1; Ohio, 1; Wisconsin, 4.

THE CANE SUGAR INDUSTRIES.

THE TWO INDUSTRIES COMBINED.

Comparative summary.—At the census of 1909 all establishments engaged in the manufacture of sugar and molasses from sugar cane were classified under the designation "sugar and molasses," while establishments engaged in the refining of cane sugar were classified under the designation "sugar refining, not including beet sugar." At previous censuses, however, these two classes of establishments were included as a single industry under the general classification "sugar and molasses, refining." In order that comparisons may be made with previous censuses, therefore, the combined statistics for the cane sugar mills and the sugar refineries for 1909 are presented in Table 10, together with the corresponding figures for 1904 and 1899.

Reports for establishments engaged in the manufacture or refining of cane sugar were obtained at censuses prior to 1899, but on such different bases that the figures are not comparable with those for the last three censuses, and for that reason are excluded from the table. In 1849, under the heading of "sugar refiners," 23 establishments were reported, with 1,656 hands and products valued at \$9,898,800; in 1859, 39, with 3,484 hands and products valued at \$42,143,234; in 1869, 59, with 4,597 hands and products valued at \$108,941,911; in 1879, 49, with 5,857 hands and products valued at \$155,484,915; and in

1889, 393, with 7,529 wage earners and products valued at \$123,118,259. In addition, in 1859 there were 2 establishments classified under the heading of "sugar and molasses," and 2 under the heading of "sugar evaporators," the former having 5 hands and products valued at \$2,280, and the latter, 27 hands and products valued at \$31,000. In 1869, 713 establishments were reported under the heading of "sugar and molasses, raw cane," employing 21,299 hands and having products valued at \$10,383,368. There were no classifications of this nature at succeeding censuses except at the census of 1909.

Table 10

	CANE SUGAR AND MOLASSES AND CANE SUGAR REFINING COMBINED.		
	1909	1904	1899.
Number of establishments.....	233	344	657
Persons engaged in the industry.....	15,658	15,799	(¹)
Proprietors and firm members.....	204	364	(¹)
Salaried employees.....	1,928	1,886	1,867
Wage earners (average number).....	13,526	13,549	14,129
Primary horsepower.....	160,603	140,650	(¹)
Capital.....	\$153,166,561	\$165,468,320	\$184,033,304
Expenses.....	267,478,001	263,082,885	236,997,444
Services.....	9,875,298	9,729,329	8,599,353
Salaries.....	2,391,576	2,153,679	1,681,524
Wages.....	7,483,722	7,575,650	6,917,829
Materials.....	247,582,804	244,752,802	221,384,769
Miscellaneous.....	10,019,899	8,600,754	7,013,322
Value of products.....	279,249,397	277,285,449	239,711,011
Value added by manufacture (value of products less cost of materials).....	31,666,593	32,532,647	18,326,242

¹ Comparable figures not available.

The statistics shown in Table 10 for censuses prior to 1909 include data for establishments engaged in the compounding of table sirups, which were assigned in 1909 to the classification "food preparations." This fact should be borne in mind in making any comparisons involving the 1909 figures. There were 38 establishments engaged in the manufacture of table sirups in 1904, the number of wage earners employed by them being 679, the amount of wages paid, \$295,442, the cost of materials, \$5,570,320, and the value of products, \$6,801,034.

The decrease in the number of establishments is due in part to the increasing use, especially in Louisiana, of large mills to crush the cane from a number of plantations, each of which formerly had its own mill, and partly to the discontinuance of small refineries.

THE MANUFACTURE OF SUGAR AND SIRUP FROM CANE.

Detailed statistics for 1909.—Table 11 gives the detailed statistics for 1909 for establishments engaged in the manufacture of sugar or sirup direct from the cane (the industry designated "sugar and molasses") for the United States as a whole, for Louisiana, and for "all other states."

SUGAR AND MOLASSES—DETAILED STATISTICS: 1909.

Table 11	United States.	Louisiana.	All other states.
Number of establishments.....	214	204	10
Persons engaged in the industry.....	5,313	5,077	236
Proprietors and firm members.....	198	193	5
Salaried officers, superintendents, and managers.....	392	377	15
Clerks.....	596	576	20
Male.....	567	552	15
Female.....	29	24	5
Wage earners:			
Average number.....	4,127	3,931	196
Number, 15th day of month—			
Maximum number, November.....	15,761	15,112	.....
Minimum number, February.....	559	419	.....
Wage earners, Dec. 15, or nearest representative day.....	15,369	14,717	652
16 years of age and over.....	15,283	14,631	652
Male.....	15,192	14,560	632
Female.....	91	71	20
Under 16 years of age.....	86	86	.....
Male.....	83	83	.....
Female.....	3	3	.....
Primary horsepower.....	122,189	118,162	4,027
Capital.....	\$37,925,770	\$34,642,802	\$3,282,968
Expenses.....	26,165,526	24,699,951	1,465,575
Services.....	2,600,172	2,442,060	158,112
Officials.....	523,598	487,433	36,165
Clerks.....	213,823	193,839	19,984
Wage earners.....	1,862,751	1,760,728	102,023
Materials.....	21,294,844	20,121,725	1,173,119
Fuel and rent of power.....	1,434,381	1,386,604	47,777
Other.....	19,860,463	18,735,121	1,125,342
Miscellaneous.....	2,270,510	2,136,226	134,284
Rent of factory.....	33,244	30,225	3,019
Taxes, including internal revenue.....	282,387	272,813	9,574
Contract work.....	43,068	40,268	2,800
Other.....	1,911,811	1,792,920	118,891
Value of products.....	30,620,738	29,001,027	1,619,711
Value added by manufacture (value of products less cost of materials).....	9,325,894	8,879,302	446,592

There were 214 establishments engaged in the manufacture of sugar or sirup from sugar cane in 1909, all but 10 of which were located in Louisiana. Of the total number, 192 manufactured sugar or sugar and sirup, and 22 sirup only. In addition to the establishments shown in the table there were 4 other estab-

lishments in that state that manufactured sugar from cane during the census year, 2 of these being classified as sugar refineries, while the other 2 were operated in connection with penal institutions, and consequently do not come within the scope of the census inquiry. Before the Civil War practically every planter had his own sugar mill, the number of these mills in 1849 in Louisiana alone being 1,490. The reduction in the number of mills has been brought about by various causes, among which the following may be mentioned: Changes in labor conditions; the considerable cost of the machinery necessary to fit up a modern plant; improved methods of transporting cane to the mills, many factories now operating small railways for this purpose; and the more economical operation possible in the larger plants.

Persons engaged in the industry.—Table 12 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

Table 12	CLASS.	PERSONS ENGAGED IN THE SUGAR AND MOLASSES INDUSTRY: 1909		
		Total.	Male.	Female.
	All classes.....	5,313	5,213	100
	Proprietors and officials.....	590	544	46
	Proprietors and firm members.....	198	154	44
	Salaried officers of corporations.....	105	103	2
	Superintendents and managers.....	287	287	.....
	Clerks.....	596	567	29
	Wage earners (average number).....	4,127	4,102	25
	16 years of age and over.....	4,104	4,080	24
	Under 16 years of age.....	23	22	1

The average number of persons engaged in the industry during 1909 was 5,313, of whom 590, or 11.1 per cent, were proprietors and officials; 596, or 11.2 per cent, clerks, this class including other subordinate salaried employees; and 4,127, or 77.7 per cent, wage earners. Of the 198 proprietors and firm members reported, 154 were males and 44 females. The large proportion of female proprietors in this industry may be attributed to the fact that a number of the plantations which control sugar mills have passed by inheritance into the hands of female owners who have been returned as proprietors. Of the total number of employees in the industry, 95.6 per cent were reported by Louisiana.

Wage earners employed, by months.—Table 13 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the United States as a whole, for the state of Louisiana, and for all other states.

Table 13
WAGE EARNERS EMPLOYED IN THE CANE SUGAR AND MOLASSES INDUSTRY: 1909

MONTH.	United States.		Louisiana.		All other states.	
	Number.	Per cent of maximum.	Number.	Per cent of maximum.	Number.	Per cent of maximum.
	January.....	1,598	10.1	1,252	8.3	346	53.3
February.....	559	3.5	419	2.8	140	21.6
March.....	715	4.5	657	4.3	58	8.9
April.....	798	5.1	739	4.9	59	9.1
May.....	874	5.5	820	5.4	54	8.3
June.....	1,040	6.6	985	6.5	55	8.5
July.....	1,122	7.1	1,071	7.1	51	7.9
August.....	920	5.8	874	5.8	48	7.1
September.....	1,322	8.4	1,256	8.3	66	10.2
October.....	9,693	61.5	9,511	62.9	182	28.0
November.....	15,761	100.0	15,112	100.0	649	100.0
December.....	15,115	95.9	14,475	95.8	640	98.6

The industry is essentially a seasonal one. The cane sugar "campaign," as the time of harvesting and crushing the cane is termed, usually begins early in October and is at its height in November, continuing through December and to a limited extent into January. The maximum number of wage earners, 15,761, was reported for November, and the minimum number, 559, for February, the latter number being equal to only 3.5 per cent of the former.

Prevailing hours of labor.—The nature of the industry, affected as it is by the shortness of the season for harvesting the cane crop and the necessity of crushing it promptly to prevent deterioration, is such that many of the mills are operated day and night during the height of the campaign. The practice of having two sets of workmen alternate in shifts of six hours each is quite common. Of the total average number of wage earners, 3,920, or 95 per cent, were returned as working in establishments where the prevailing hours were 72 or more per week.

Character of ownership.—Table 14 presents statistics with respect to the character of ownership of establishments in the cane sugar and molasses industry for the census year 1909.

Table 14
CANE SUGAR AND MOLASSES INDUSTRY: 1909

CHARACTER OF OWNERSHIP.	CANE SUGAR AND MOLASSES INDUSTRY: 1909			
	Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.
Total	214	4,127	\$30,620,738	\$9,325,894
Individual.....	73	949	6,701,121	1,927,335
Firm.....	43	610	4,558,841	1,330,342
Corporation.....	98	2,568	19,360,776	6,068,217
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	34.1	23.0	21.9	20.7
Firm.....	20.1	14.8	14.9	14.3
Corporation.....	45.8	62.2	63.2	65.1

The conditions regarding ownership of establishments in this industry are in general widely different from those obtaining in most other industries. Many of the sugar mills at the present time are owned by the interests which control the plantation on which the

mills are situated, and since a large proportion of the plantations are still owned by individuals and firms, it is not surprising that 54.2 per cent of the total number of establishments were reported as under these two classes of ownership, and that less than two-thirds of the total value of products was returned by establishments controlled by corporations.

Size of Establishments.—Table 15 presents statistics for 1909 for establishments grouped according to the value of their products.

Table 15
CANE SUGAR AND MOLASSES INDUSTRY: 1909

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.
Total	214	4,127	\$30,620,738	\$9,325,894
Less than \$5,000.....	8	9	19,417	9,404
\$5,000 and less than \$20,000.....	7	30	90,182	23,997
\$20,000 and less than \$100,000.....	108	1,070	6,236,339	1,664,648
\$100,000 and over.....	91	3,018	24,274,800	7,627,845
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	3.7	0.2	0.1	0.3
\$5,000 and less than \$20,000.....	3.3	0.7	0.3	0.1
\$20,000 and less than \$100,000.....	50.5	25.9	20.4	17.8
\$100,000 and over.....	42.5	73.1	79.3	81.8

Of the 214 establishments in the sugar and molasses industry, 91 reported products to the value of \$100,000 or more in 1909. Of these, 38 reported a value of products between \$100,000 and \$200,000; 49, between \$200,000 and \$500,000; 3, between \$500,000 and \$1,000,000; and 1, a value exceeding \$1,000,000. These 91 establishments reported 3,018 wage earners, or 73.1 per cent of the total number, and products valued at \$24,274,800, or 79.3 per cent of the total. The establishments having products of less than \$20,000 in value were mostly those engaged in the manufacture of sirup only.

Of the 192 establishments which manufactured sugar from cane in 1909, 62 crushed less than 10,000 tons of cane; 59, between 10,000 and 20,000 tons; 51, between 20,000 and 50,000 tons; and 20 crushed 50,000 tons or over. Considerably more than half of the total number of establishments crushed less than 20,000 tons of cane, while the 20 establishments which crushed 50,000 tons or over handled about one-third of the total quantity of cane used.

Expenses.—Table 11 shows the total expenses in 1909 to have been \$26,165,526, distributed as follows: Cost of materials, \$21,294,844, or 81.4 per cent; wages, \$1,862,751, or 7.1 per cent; salaries, \$737,421, or 2.8 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$2,270,510, or 8.7 per cent.

Engines and power.—Table 16 shows statistics of power as reported at the census of 1909.

Practically all (99.2 per cent) of the 122,189 horsepower used in this industry is steam power.

POWER.	CANE SUGAR AND MOLASSES INDUSTRY: 1909		
	Number of engines or motors.	Horsepower.	Per cent distribution of horsepower.
Primary power, total.....	2,144	122,189	100.0
Owned.....	2,136	121,819	99.7
Steam.....	2,105	121,229	99.2
Gas.....	31	380	0.3
Other.....		210	0.2
Rented—Electric.....	8	370	0.3
Electric motors.....	121	3,995	100.0
Run by current generated by establishment..	113	3,625	90.7
Run by rented power.....	8	370	9.3

Fuel used.—There were consumed in this industry in 1909, for generating power and otherwise, 576,475 tons of coal, 500 tons of coke, 43,242 cords of wood, 2,040,309 barrels of oil, and 262,000 feet of gas. In addition, large quantities of bagasse, the pulp of the sugar cane from which the juice has been extracted, were also used for fuel. No data were collected with regard to the quantity of this refuse product utilized, but practically all of the important mills use it for fuel to a greater or less extent.

Materials used.—The special schedule used in collecting the statistics for the cane sugar industry required a detailed report of the quantity and cost (or value) of the cane used. Inquiry was also made as to the source of the cane supply—that is, whether it was grown on plantations controlled by the operators of the factories and cultivated either directly by them or by tenants, or was grown elsewhere. Table 17 gives this information with regard to the cane used, together with the cost of other materials, for the United States as a whole, for Louisiana, and for all other states combined.

MATERIAL.	CANE SUGAR AND MOLASSES INDUSTRY: 1909		
	United States.	Louisiana.	All other states.
Total cost.....	\$21,294,844	\$20,121,725	\$1,173,119
Cane crushed: ¹			
Quantity (tons).....	4,520,419	4,405,626	114,793
Cost.....	\$17,211,752	\$16,859,870	\$351,882
Grown on plantations controlled by mill owners—			
Quantity (tons).....	2,613,468	2,554,999	58,469
Cost.....	\$9,730,148	\$9,579,611	\$150,537
Purchased—			
Quantity (tons).....	1,906,951	1,850,627	56,324
Cost.....	\$7,481,604	\$7,280,259	\$201,345
Fuel and rent of power.....	\$1,434,381	\$1,386,604	\$47,777
All other materials ²	\$2,648,711	\$1,875,251	\$773,460

¹ By sugar mills only; specific data were not secured for the 22 mills making sirup only.

² Includes cost of cane crushed by mills making sirup only.

Of the total quantity of cane crushed in the sugar mills, nearly three-fifths (57.8 per cent) was grown on plantations controlled by the operators of the mills. The cost of cane grown on plantations controlled by the operators, as returned by the latter, was based on current market prices and is not, therefore, the cost of

production. As thus reported, the cost of such cane was \$9,730,148, an average of \$3.72 per ton, while the cost of cane purchased was \$7,481,604, an average of \$3.92 per ton. Of the total cost of materials used, the cost of cane crushed by establishments which made sugar constituted 80.8 per cent; the cost of fuel and rent of power, 6.7 per cent; and the cost of all other materials, including the cost of cane treated by establishments which made sirup only, 12.4 per cent.

Products.—Supplementary data were obtained regarding the products made in the establishments which manufactured sugar. Table 18 gives the quantity and value of the different products of these establishments for the United States as a whole, for the state of Louisiana, and for all other states.

PRODUCT.	CANE SUGAR AND MOLASSES INDUSTRY: 1909		
	United States.	Louisiana.	All other states.
Total value.....	\$30,620,738	\$29,001,027	\$1,619,711
Sugar:			
Quantity (tons).....	1,326,858	320,507	6,351
Value.....	\$26,095,673	\$25,613,791	\$481,882
Brown or open kettle—			
Quantity (tons).....	3,678	3,678	
Value.....	\$301,386	\$301,386	
Vacuum pan—			
Quantity (tons).....	323,180	316,829	6,351
Value.....	\$25,794,287	\$25,312,405	\$481,882
First strike—			
Quantity (tons).....	272,111	267,509	4,602
Value.....	\$22,289,037	\$21,916,715	\$372,722
Second strike—			
Quantity (tons).....	41,975	40,658	1,317
Value.....	\$2,921,101	\$2,839,411	\$81,690
Third strike—			
Quantity (tons).....	9,094	8,662	432
Value.....	\$584,149	\$556,679	\$27,470
Molasses:			
Quantity (gallons).....	1,24,587,581	23,875,253	712,328
Value.....	\$2,845,559	\$2,797,919	\$47,640
Sirup: ²			
Quantity (gallons).....	1,449,860	942,997	506,863
Value.....	\$365,632	\$246,881	\$118,751
All other products ³	\$1,313,874	\$342,436	\$971,438

¹ In addition, 7,281 tons of raw cane sugar and 693,302 gallons of molasses were made by establishments connected with two penal institutions and two establishments engaged chiefly in the refining of sugar.

² Product of sugar mills only.

³ Includes value of sirup reported by establishments which made no sugar.

The total value of products for the industry amounted to \$30,620,738, of which all but \$1,619,711 was reported for Louisiana. The total quantity of sugar manufactured amounted to 326,858 tons, valued at \$26,095,673, of which Louisiana produced 320,507 tons, valued at \$25,613,791. The manufacture of brown sugar by the open-kettle process has been almost entirely abandoned, although 18 establishments in Louisiana used this process in the manufacture of 3,678 tons, valued at \$301,386, or an average of 4.1 cents per pound. There were 323,180 tons of vacuum-pan sugar manufactured during the year, of which 272,111 tons, or 84.2 per cent, were obtained on first strike; 41,975 tons, or 13 per cent, on second strike; and 9,094 tons, or 2.8 per cent, on third strike. In this connection it should be stated that some mills did not carry the process of manufacture beyond the first—and many not beyond the second—strike, because of the lack of equipment to conduct further processes with profit.

The quantity and value of the molasses remaining as a by-product are affected by the quantity of the sugar content extracted. Some of the mills extracted practi-

cally the entire amount of the available sugar content, in which case the molasses was worth only from 4 to 6 cents a gallon. In many establishments, however, only a portion of the available sugar was extracted, and the molasses remaining was worth from 10 to 30 cents per gallon. The total quantity of molasses reported was 24,587,581 gallons, with a total value of \$2,845,559, or an average value of 11.6 cents per gallon. Some of the mills reporting sugar also reported sirup, the liquid product from which no sugar has been extracted. The total quantity of sirup reported by such mills was 1,449,860 gallons, valued at \$365,632, the average value being 25.2 cents a gallon. The quantity of sirup manufactured in the 22 mills which made no sugar was not obtained, and its value is included in the table under the heading "all other products."

THE CANE SUGAR REFINING INDUSTRY.

Detailed statistics for 1909.—This industry, which is formally designated "sugar refining, not including beet sugar," comprises those establishments which are engaged primarily in the refining of cane sugar. Separate statistics for these establishments are presented for the first time, as already stated, at the census of 1909. At prior censuses the statistics of establishments engaged in refining sugar were combined with those which manufactured sugar and molasses from cane and those engaged in the compounding of table sirups. The manufacturing operations in the cane mills and in the refineries are, however, so dissimilar and distinct that the statistics for each are shown separately for 1909.

CANE SUGAR REFINING, NOT INCLUDING BEET SUGAR—DETAILED STATISTICS: 1909.

Table 19	United States.
Number of establishments.....	1 19
Persons engaged in the industry.....	10,345
Proprietors and firm members.....	6
Salaried officers, superintendents, and managers.....	193
Clerks.....	747
Male.....	695
Female.....	52
Wage earners:	
Average number.....	9,399
Number, 15th day of month—	
Maximum number, July.....	9,952
Minimum number, January.....	7,935
Wage earners, Dec. 15, or nearest representative day.....	9,765
16 years of age and over.....	9,719
Male.....	9,434
Female.....	285
Under 16 years of age.....	46
Male.....	42
Female.....	4
Primary horsepower.....	38,414
Capital.....	\$115,240,791
Expenses.....	241,312,475
Services.....	7,275,126
Officials.....	820,755
Clerks.....	833,400
Wage earners.....	5,620,971
Materials.....	226,287,960
Fuel and rent of power.....	2,866,371
Other.....	223,421,589
Miscellaneous.....	7,749,389
Rent of factory.....	198,550
Taxes, including internal revenue.....	371,851
Other.....	7,178,988
Value of products.....	248,628,659
Value added by manufacture (value of products less cost of materials).....	22,340,639

¹ Includes establishments distributed as follows: California, 2; Louisiana, 5; Massachusetts, 2; New Jersey, 2; New York, 5; Pennsylvania, 2; Texas, 1.

Table 19 gives detailed statistics for the sugar refining industry for 1909. Corresponding figures can

not be given by states without disclosing individual operations.

The gross value of products amounted to \$248,628,659 and the value added by manufacture (value of products less cost of materials) to \$22,340,699. No data were collected showing the value of the different products manufactured, but practically the entire amount is represented by the value of refined sugar.

Persons engaged in the industry.—Table 20 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and, in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners is an estimate obtained by the method described in the Introduction.

Table 20 CLASS.	PERSONS ENGAGED IN THE CANE SUGAR REFINING INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	10,345	10,015	330
Proprietors and officials.....	199	199	.....
Proprietors and firm members.....	6	6	.....
Salaried officers of corporations.....	35	35	.....
Superintendents and managers.....	158	158	.....
Clerks.....	747	695	52
Wage earners (average number).....	9,399	9,121	278
16 years of age and over.....	9,354	9,080	274
Under 16 years of age.....	45	41	4

The average number of persons engaged in the sugar refineries during 1909 was 10,345, of whom 9,399, or 90.9 per cent, were wage earners; 199, or 1.9 per cent, proprietors and officials; and 747, or 7.2 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 10,015, or 96.8 per cent, were males, and 330, or 3.2 per cent, females. The average number of wage earners under 16 years of age was only 45. The number of wage earners employed on December 15, or the nearest representative day, distributed by age and sex, is given in Table 19.

Wage earners employed, by months.—Table 21 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909.

Table 21 MONTH.	WAGE EARNERS EMPLOYED IN THE CANE SUGAR REFINING INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	7,935	79.7
February.....	8,653	86.9
March.....	9,890	99.4
April.....	9,652	97.0
May.....	9,492	95.4
June.....	9,926	99.7
July.....	9,952	100.0
August.....	9,613	96.6
September.....	9,680	97.3
October.....	9,341	93.9
November.....	9,588	96.3
December.....	9,048	90.9

The largest number of wage earners reported for any month of 1909 was 9,952, in July, and the smallest number, 7,935, in January, the minimum number being equal to 79.7 per cent of the maximum.

Prevailing hours of labor.—The wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

No wage earners were reported as employed in establishments where the prevailing hours were less than 60 per week. Nearly one-half (48.5 per cent) of the wage earners in the industry in 1909 were in refineries where the prevailing hours were 60 per week. The second largest group was made up of those in establishments where the prevailing hours were 72 or over per week, which group formed 31.5 per cent of the total.

Character of ownership and size of establishments.—Sixteen of the 19 establishments reported for 1909 were under corporate ownership, and these establishments reported the great bulk of the value of products of the industry. The average value of products per establishment was \$13,085,719, and the average value added by manufacture, \$1,175,826. The average number of wage earners per establishment was 494.7. Of the 19 establishments reported, 52.6 per cent employed from 251 to 500 wage earners each. There were 5 establishments that employed more than 500 wage earners, and of these, 1 employed over 1,000.

Expenses.—Table 19 shows the total expenses for the industry in 1909 to have been \$241,312,475, distributed as follows: Cost of materials, \$226,287,960, or 93.8 per cent; wages, \$5,620,971, or 2.3 per cent; salaries, \$1,654,155, or seven-tenths of 1 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$7,749,389, or 3.2 per cent.

Engines and power.—Table 22 shows statistics of power as reported at the census of 1909.

Practically all (97.5 per cent) of the primary power used in the sugar refining industry in 1909 consisted of steam power, only 2.5 per cent of the total being rented electric power. Of the total electric power (14,735 horsepower), 13,789 horsepower, or 93.5 per cent, was generated in the establishments reporting.

Fuel consumed.—Coal was the principal kind of fuel used in the sugar refining industry in 1909, of which 542,148 short tons were bituminous and 511,640 long tons, anthracite. Of oil, including gasoline, 578,633 barrels were consumed. In addition, small quantities of coke, wood, and gas were reported.

Table 22

POWER.	CANE SUGAR REFINING INDUSTRY: 1909		
	Number of engines or motors.	Horse-power.	Per cent distribution of horse-power.
Primary power, total.....	464	38,414	100.0
Owned.....	404	37,468	97.5
Steam.....	403	37,453	97.5
Gas.....	1	15	(1)
Rented—Electric.....	60	946	2.5
Electric motors.....	985	14,735	100.0
Run by current generated by establishment...	925	13,789	93.5
Run by rented power.....	60	946	6.5

¹ Less than one-tenth of 1 per cent.

THE SUGAR INDUSTRY IN HAWAII.

General description of the industry.—The manufacture of sugar from cane is the most important industry in Hawaii, contributing 75.8 per cent of the total value of products for all manufacturing industries in 1909. Only three countries—Cuba, British India, and Java—produce more cane sugar than Hawaii.

Practically every important cane growing plantation on the island has its own sugar mill, built primarily for crushing the cane grown on the plantation. In some instances, however, the plantation mills crush cane grown on other plantations, while a few mills are engaged exclusively in crushing cane grown by others. The most modern machinery and equipment have been installed in the mills and a high percentage of sugar is extracted, the molasses remaining as a by-product being practically worthless, except for fertilizer or cattle feed. Nearly 20 per cent of the raw sugar used by the refineries in continental United States is obtained from Hawaii, 491,545 tons having been imported during the fiscal year 1909. The statistics for Hawaii are not included in the preceding tables, which are confined to establishments in continental United States.

Growth of the industry.—Hawaii was annexed to the United States in 1898 and organized as a territory in 1900, and was included in the census of 1899, which was the first enumeration of its manufactures. The industrial census of 1904, however, was confined to continental United States and no canvass was made of Hawaii. Table 23 gives the more important figures relative to the sugar industry on the island, as returned at the censuses of 1909 and 1899, together with the percentages of increase for the 10-year period.

Notwithstanding the fact that practically the same number of establishments were reported for both censuses, 46 in 1909 and 44 in 1899, the value of products increased \$16,695,049, or 86.7 per cent, during the 10 years covered by the table, and the percentages of increase for most of the other items shown in Table 23 were correspondingly high.

Table 23

	CANE SUGAR AND MOLASSES INDUSTRY OF HAWAII.		
	1909	1899	Per cent of increase: ¹ 1899-1909
Number of establishments.....	46	44	4.5
Persons engaged in the industry.....	2,709	2,759	-1.8
Proprietors and firm members.....	13	5	160.0
Salaried employees.....	179	385	-53.5
Wage earners (average number).....	2,517	2,369	6.2
Primary horsepower.....	36,426	17,774	104.9
Capital.....	\$13,724,308	\$7,991,642	71.7
Expenses.....	22,042,499	11,510,381	91.6
Services.....	1,047,496	1,111,726	-5.8
Salaries.....	266,216	363,610	-26.8
Wages.....	781,280	748,116	4.4
Materials.....	18,542,075	9,777,922	89.6
Miscellaneous.....	2,452,928	620,733	295.2
Value of products.....	35,949,822	19,254,773	86.7
Value added by manufacture (value of products less cost of materials).....	17,407,747	9,476,851	83.7

¹ A minus sign (-) denotes decrease.

As already stated, practically all of the sugar factories in Hawaii are located on and operated in connection with sugar plantations. The employees engaged on the plantations frequently work in the sugar factory and in many instances the expenses of the factory are so mingled with those for the operation of the plantation that it is impossible to obtain separate statistics of the number of employees or the expenses of the factory as distinct from those of the plantation. It is possible that at the census of 1899 a larger or smaller proportion of the number of employees and expenses for some plantations was assigned to the factories than was so assigned at the census of 1909, though it is probable that these differences are not sufficient seriously to affect the comparability of the figures reported for the two censuses.

Exports of sugar.—Practically all of the sugar production of Hawaii is exported to the United States in the form of raw sugar, the imports from Hawaii forming nearly one-fifth of the total amount of raw cane sugar used in the refineries of continental United States. The statistics of exports of sugar and molasses for specified years from 1875 to 1910, inclusive, as taken from the Hawaiian Annual, 1913, are summarized in Table 24.

Table 24

YEAR ENDING JUNE 30—	EXPORTS OF SUGAR AND MOLASSES FROM HAWAII.				
	Total value.	Sugar. ¹		Molasses.	
		Pounds.	Value.	Gallons.	Value.
1910.....	\$42,625,069	1,111,594,466	\$42,625,062	100	\$7
1909.....	37,632,821	1,022,863,927	37,632,742	728	79
1904.....	24,360,097	736,491,992	24,359,385	11,187	712
1899.....	21,898,550	545,370,537	21,898,191	11,455	359
1895.....	7,978,628	294,784,819	7,975,590	44,970	3,038
1890.....	12,167,188	259,789,462	12,159,585	74,926	7,603
1885.....	8,363,112	171,350,314	8,356,062	57,941	7,050
1880.....	4,352,465	63,584,871	4,322,711	198,355	29,754
1875.....	1,228,573	25,080,182	1,216,389	93,722	12,184

¹ Includes both raw and refined sugar.

Prior to 1905 there were no sugar refineries in Hawaii. In that year, however, one was established, and since that time sugar has been refined for the Hawaiian market as well as for export. The quantity

of refined sugar exported to the United States amounted to 10,559 tons in 1905 and to 19,887 tons in 1909.

THE SUGAR INDUSTRY IN PORTO RICO.

Development of the industry.—The sugar industry was first established in Porto Rico in 1548, but its growth was slow, the total production in 1830 being only 15,757 tons. While some establishments still employ the primitive open-kettle method of manufacture, a number have installed modern machinery and methods, with greatly increased economy in the production of sugar, and the total output in 1909 amounted to 283,223 tons. The census of manufactures of 1909 was the first taken in Porto Rico, and comparative statistics are, therefore, not available.

Summary for 1909.—Table 25 presents a summary of the statistics for the industry in 1909.

Table 25

	Sugar and molasses.
Number of establishments.....	108
Persons engaged in the industry.....	5,898
Proprietors and firm members.....	246
Salaried employees.....	590
Wage earners (average number).....	5,062
Primary horsepower.....	31,055
Capital.....	\$20,709,796
Expenses.....	16,603,922
Services.....	2,176,443
Salaries.....	947,858
Wages.....	1,227,585
Materials.....	12,273,555
Miscellaneous.....	2,154,924
Value of products.....	20,569,348
Value added by manufacture (value of products less cost of materials).....	8,295,793

There were 108 establishments engaged in the manufacture of sugar and molasses in Porto Rico in 1909. Of these, 85 were controlled by individuals and firms, thus accounting for the relatively large number of proprietors and firm members. The aggregate value of products was \$20,569,348, of which \$20,164,887 represented the value of sugar. Many of the mills are small, 48 of them reporting products valued at less than \$5,000. It is probable that, in the case of some of the mills located on plantations, the expenses were so interwoven with those for the operation of the plantation that they could not be segregated.

Exports of sugar.—Table 26 gives the quantity of sugar exported from Porto Rico for specified years. Practically the whole quantity exported in recent years has been taken by the United States.

Table 26

YEAR.	Sugar exported from Porto Rico (pounds). ¹	YEAR.	Sugar exported from Porto Rico (pounds). ¹
1910.....	569,045,148	1901.....	137,817,472
1909.....	488,512,440	1897.....	126,827,472
1908.....	469,213,567	1890.....	128,021,909
1907.....	408,157,696	1880.....	221,242,894
1906.....	410,553,706	1870.....	191,649,670
1905.....	271,325,118	1860.....	116,015,151
1904.....	259,294,060	1850.....	112,129,432
1903.....	226,215,132	1840.....	81,793,693
1902.....	183,822,636	1830.....	34,016,375

¹ The statistics for selected years from 1830 to 1897, inclusive, relate to the calendar year, and were taken from the report of the Military Governor of Porto Rico, 1900, while those for the years 1901 to 1910, inclusive, are for fiscal years ending June 30, and are taken from the reports of the Bureau of Foreign and Domestic Commerce, Department of Commerce.

THE LUMBER INDUSTRY

(485)

THE LUMBER INDUSTRY.

GENERAL STATISTICS.

Summary for the industry: 1909.—Table 1 presents a summary of the statistics for the lumber industry as a whole for 1909. It distinguishes four classes of establishments: (1) Logging camps and merchant sawmills, including planing mills where operated in connection with sawmills; (2) independent planing mills; (3) wooden packing-box factories; and (4) custom sawmills. Small establishments engaged primarily in work on materials owned by others are classified as custom mills, while establishments manufacturing products from materials which they own and large establishments doing contract sawing are classified as merchant

mills. The establishments included in the first class comprise all merchant sawmills using logs or bolts as materials and also all logging camps, while those not using these materials are assigned to the second or the third group according to their product of chief value. So many of the merchant mills in the industry carry on two or all three classes of operations, however, that only the totals for all branches combined are shown in the general tables. Statistics for custom mills are given in Tables 1, 2, 22, and 25 of this report, all other tables showing statistics for merchant establishments exclusively.

	Total.	Merchant establishments.			Custom sawmills.
		Sawmills and logging camps.	Independent planing mills.	Wooden packing-box factories.	
Number of establishments.....	44,804	33,090	6,402	1,179	4,133
Persons engaged in the industry.....	797,825	613,601	132,511	33,877	12,836
Proprietors and firm members.....	54,527	41,489	6,247	1,089	5,702
Salaried employees.....	41,189	24,934	13,872	2,339	44
Wage earners (average number).....	702,109	547,178	112,392	35,449	7,090
Primary horsepower.....	2,933,362	2,316,634	410,950	112,498	93,280
Capital.....	\$1,182,330,552	\$863,870,850	\$257,748,437	\$55,056,120	\$5,655,145
Expenses.....	997,783,110	633,005,947	293,743,084	63,873,803	2,180,271
Services.....	367,863,055	268,409,862	79,589,663	18,167,378	1,696,152
Salaries.....	47,436,596	29,543,056	15,053,254	2,831,386	8,900
Wages.....	320,426,459	238,866,806	64,536,409	15,335,992	1,687,252
Materials.....	508,215,153	265,559,595	196,079,522	46,478,462	97,574
Miscellaneous.....	121,704,902	99,036,490	18,073,899	4,227,963	366,545
Value of products.....	1,160,644,628	753,388,368	327,397,891	75,342,488	4,515,881
Value added by manufacture (value of products less cost of materials).....	652,429,475	487,828,773	131,318,369	28,864,026	4,418,307

The extent to which the first three classes of establishments shown in the table overlap is indicated by the fact that in 1909 the value of the dressed lumber and other planing-mill products reported by sawmills amounted to \$222,325,705, which is equal to 67.9 per cent of the total value of the products reported by independent planing mills. The cost of materials, labor, etc., involved in the manufacture of these products could not be separated from those for the production of rough lumber. In like manner many planing mills manufactured boxes, but the statistics for this branch of their business, or even the value of the boxes produced, could not be segregated.

The establishments in the industry as a whole in 1909 gave employment to an average of 797,825 persons, of whom 702,109 were wage earners, and paid out \$367,863,055 in salaries and wages. The cost of the materials used in the industry as a whole in 1909 was \$508,215,153, which is equal to 43.8 per cent of the total value of products (\$1,160,644,628), and the value

added by manufacture (that is, the value of products less cost of materials) was \$652,429,475. The figures for cost of materials and value of products involve a considerable amount of duplication for the reason that the same lumber may undergo manufacturing processes in two or three different establishments, its value figuring both in the cost of materials and in the value of products for each establishment. Where logging operations are concerned, the cost of materials includes the value of the standing timber even when owned by the operator.

In addition to the products for which figures are given in Table 1, lumber and its more elementary products to the value of \$5,667,950 were reported for 1909 by establishments engaged primarily in the manufacture of other products, chiefly furniture and refrigerators, fancy and paper boxes, and pianos and organs and materials. These products, however, are not included in the product whose value is given in Table 1. On the other hand, the value of products shown in

Table 1 includes \$1,002,731 representing receipts from the custom grinding of flour-mill and gristmill products and \$5,730,556 representing the value of foundry and machine-shop products, cooperage and wooden goods, and other subsidiary products reported for 1909 by establishments in the lumber industry.

Of the 44,804 establishments canvassed for 1909, 9.2 per cent were custom mills, these mills employing only 1 per cent of the wage earners in the industry and contributing only four-tenths of 1 per cent of the total value of products. The small proportion of the total value of products reported by such mills results from the fact that their value of products consists almost entirely of the amounts received for work done, the value of the lumber sawed which is owned by others not being included.

Merchant sawmills and logging camps formed more than four-fifths of the total number of merchant establishments in the industry in 1909, the value of their products amounting to \$753,388,368, or 65.2 per cent of the total for merchant establishments and 64.9 per cent of that for all establishments combined, while they gave employment to 547,178 wage earners, or 77.9 per cent of the total number in the industry and 78.7 per cent of those in merchant establishments. The principal products of logging camps are saw logs; shingle, stave, and heading bolts; telegraph and telephone poles; fence posts; and hewed railway ties. Those of sawmills include rough lumber, shingles, cooperage materials, veneers, lath, and sawed railway ties. When the logging and sawing are done by the same concern, there is no duplication in value of products, but so far as logs are purchased from other establishments in the industry there is duplication.

The 6,402 independent planing mills reported for 1909 formed 15.7 per cent of the total number of merchant establishments in the industry and gave employment to 16.2 per cent of the wage earners in merchant establishments and 16 per cent of those in the industry as a whole, while the value of their products formed 28.3 per cent of the total for merchant establishments and 28.2 per cent of the total for all establishments combined. The establishments included in this subclassification manufacture principally dressed lumber; sash,

doors, and blinds; interior woodwork; and moldings. Among the minor products are cattle stanchions, water tubs and cisterns, wooden tanks, wooden pipe, and wooden covering for water and steam pipes.

The 1,179 wooden packing-box factories reported formed 2.9 per cent of the total number of merchant establishments in the lumber industry, employed 5.1 per cent of the wage earners in such establishments, and contributed 6.5 per cent of the total value of products. Box shooks; wooden boxes used for packing; crates for butter, fruits, and vegetables; egg cases; carrier trays; and wine cases are the principal products reported for establishments included under this subclassification. Many manufacturing concerns in a variety of industries make packing boxes for their own products, but the census schedules did not call for the value of such containers as a separate item and statistics for them are not included in this report.

Comparison with previous censuses.—The census of 1909 was the first at which the establishments constituting the lumber industry were united under a single classification. At the censuses of 1904 and 1899 three independent classifications were employed: (1) "Lumber and timber products," corresponding practically to the present subclassification of logging camps and merchant sawmills; (2) "lumber, planing-mill products, including sash, doors, and blinds," the scope of which was the same as that of the second subclassification for 1909; and (3) "boxes, wooden packing," corresponding to the third subclassification at present employed. At the present census, however, it was deemed best, on account of the large amount of overlapping between the different classifications, to combine them all under a single head. At censuses prior to 1899 the establishments constituting the lumber industry as at present defined were included under a number of independent classifications.

Table 2 summarizes the statistics of the lumber industry (merchant establishments and custom establishments combined) for each census from 1859 to 1909, inclusive, the statistics for the various independent classifications into which the lumber industry as at present defined was divided at the different censuses being combined.

Table 2

LUMBER INDUSTRY, INCLUDING CUSTOM MILLS.

	Number or amount.						Per cent of increase. ¹				
	1909	1899	1889	1879	1869	1859	1899-1909	1889-1899	1879-1889	1869-1879	1859-1869
	Number of establishments.....	44,804	38,110	26,913	28,851	29,256	22,685	17.6	41.6	-6.7	-1.4	29.0
Persons engaged in the industry.....	797,825	447,389	(²)	(²)	(²)	(²)	78.3				
Proprietors and firm members.....	54,527	49,307	(²)	(²)	(²)	(²)	10.6				
Salaried employees.....	41,189	19,242	(²)	(²)	(²)	(²)	114.1				
Wage earners (average number).....	702,109	378,840	404,815	193,199	189,413	90,416	85.3	-6.4	(³)	(³)	(³)
Primary horsepower.....	2,933,362	1,889,050	1,165,875	(²)	716,113	(²)	55.3	62.0			
Capital.....	\$1,182,330,552	\$752,653,962	\$691,065,223	\$224,840,197	\$186,998,274	\$86,330,266	57.1	8.9	207.4	20.2	116.6
Expenses.....	997,783,110	629,690,153	549,249,797	(²)	(²)	(²)	68.5	14.6			
Services.....	367,863,055	162,559,390	154,563,073	49,093,887	58,404,678	26,925,179	126.3	5.2	214.8	-15.9	116.9
Salaries.....	47,436,596	17,482,622	(²)	(²)	(²)	(²)	171.3				
Wages.....	320,426,459	145,076,768	(²)	(²)	(²)	(²)	120.9				
Materials.....	508,215,153	440,568,199	361,703,436	199,256,320	154,373,572	58,831,010	15.4	21.8	81.5	29.1	162.4
Miscellaneous.....	121,704,902	26,562,564	32,925,669	(²)	(²)	(²)	358.2	-19.4			
Value of products.....	1,160,644,628	773,181,142	647,093,674	310,720,635	298,171,488	122,497,017	50.1	19.5	102.4	7.2	143.4
Value added by manufacture (value of products less cost of materials).....	652,429,475	332,612,943	285,390,230	120,464,315	143,797,916	63,666,007	96.2	16.5	136.9	-16.2	125.9

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The reports for the censuses prior to 1899 included, without distinction, both merchant mills and custom mills. As custom mills were not canvassed at the census of 1904, no statistics for that year are shown.

The financial figures for 1869 in this and other tables are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

The number of establishments in the industry in 1909 was practically twice as great as that in 1859, while the value of products reported for 1909 was over nine times as great as the value for 1859. During the decade 1899-1909 the number of wage earners in the industry increased 85.3 per cent, while the value of products increased \$387,463,486, or 50.1 per cent, the relative increase in this item being very much greater than that in cost of materials, which was only 15.4 per cent.

The growth of the industry, as measured by the increase in value of products, was more rapid during the decade 1859-1869 than during any other decade covered by the table, although the actual increase in value of products for the decade was somewhat less than that shown in the table, owing to the fact, already noted, that the financial figures for 1869 were reported in a depreciated currency. The smallest relative increase in value of products shown for any decade covered by the table was that for the decade 1869-1879 (7.2 per cent). This, however, is due entirely to the fact that the figures for 1869 were reported in depreciated currency, as when allowance is made for this the smallest relative increase is shown for the decade 1889-1899.

As already stated, the establishments constituting the first branch of the lumber industry, as at present defined, constituted an independent industry under the classification employed at the censuses of 1904 and 1899, being included under the designation "lumber and timber products," which is now employed for the industry as a whole.

In 1889 two classifications were employed for establishments engaged in this branch of the industry—"lumber and other mill products from logs and bolts" and "timber products not manufactured at mills"; in 1879, three—"lumber, sawed," "shingles, split," and "veneering"; in 1869, three—"lumber, sawed," "staves, shooks, and headings," and "veneering"; and in 1859, six—"lumber, sawed," "masts and spars," "shingles and lath," "staves, headings, hoops, and shooks," "timber cut and timber hewed," and "veneers." It is uncertain to what extent logging camps, especially if not connected with sawmills, were covered at the earlier censuses.

Statistics for sawmills and logging camps, as reported for each census from 1859 to 1909, are given in the following table, the separate classes shown at the

earlier censuses being combined. The statistics are roughly comparable, although the figures for censuses prior to 1899 include those for the custom mills.

Table 3 MERCHANT SAWMILLS AND LOGGING CAMPS

CENSUS.	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	33,090	547,178	\$238,866,806	\$265,559,595	\$753,388,368	\$487,828,773
1904.....	19,121	404,563	182,949,649	183,708,296	579,777,310	396,069,014
1899.....	23,043	413,257	147,951,886	242,617,767	555,042,605	312,424,838
1889.....	22,607	311,886	87,915,659	242,532,098	437,898,942	195,366,844
1879.....	25,758	148,290	31,893,098	146,312,937	233,608,886	87,298,949
1869.....	25,842	150,091	40,054,472	103,473,348	210,401,077	106,927,729
1859.....	20,870	77,439	22,196,533	45,368,925	98,679,948	53,311,023

The manufacture of the various classes of planing-mill products by independent mills was shown for the first time at the census of 1889 under the classification "lumber, planing-mill products, including sash, doors, and blinds," this classification, as already noted, also being used at the censuses of 1899 and 1904 and corresponding practically to the second branch of the industry as at present defined. In 1879 two separate classifications were employed, "lumber, planed," and "sash, doors, and blinds." In 1869 the same classifications were employed as in 1879, together with the additional classification "wood brackets, moldings, and scrolls." In 1859 the classifications "pump logs," "drainpipe, wooden," and "splints" were employed in addition to "lumber, planed," and "sash, doors, and blinds."

The statistics for the manufacture of planing-mill products are given in the following table for each census from 1859 to 1909, inclusive, the various classifications employed for the establishments manufacturing such products at the earlier censuses being combined. As already stated, the large planing-mill business done in connection with sawmills is not covered by the table.

Table 4 INDEPENDENT PLANING MILLS.

CENSUS.	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	6,402	112,392	\$64,536,409	\$196,079,522	\$327,397,891	\$131,318,369
1904.....	5,009	97,674	60,713,607	143,137,662	247,441,956	104,304,294
1899.....	4,198	73,510	32,621,704	99,568,501	167,786,122	68,217,621
1889.....	3,670	79,923	42,221,856	104,926,834	183,681,552	78,754,718
1879.....	2,491	37,187	14,431,654	45,268,462	73,424,681	28,156,219
1869.....	2,783	34,766	16,716,528	46,946,585	80,277,550	33,330,965
1859.....	1,456	11,179	4,086,629	12,179,527	21,237,383	9,057,856

The decrease in the value of products of the planing-mill branch of the lumber industry between 1889 and 1899 was due to the increasing extent to which lumber was planed in establishments classified as sawmills. The apparent decrease between 1869 and 1879 results from the fact, already mentioned, that the value for

1869 was reported in a depreciated currency. If the figures were reduced to a gold basis, the decade 1869-1879 would show an increase.

The classification "boxes, wooden packing," under which the establishments constituting the third branch of the industry were included at censuses prior to that of 1909, was first employed at the census of 1879. In 1869 "boxes, cheese," and "boxes, tobacco" (not cigar boxes), were shown separately from "boxes, wooden packing." In 1859 statistics were presented for the manufacture of "boxes, sugar," and of "box shooks," as well as of cheese, tobacco, and packing boxes. The figures for these separate classifications have been combined for the various years in Table 5.

CENSUS.	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	1,179	35,449	\$15,335,992	\$46,478,462	\$75,342,488	\$28,864,026
1904.....	1,023	30,329	12,171,104	33,478,991	57,047,743	23,568,752
1899.....	892	21,999	7,821,388	22,777,573	38,163,633	15,386,060
1889.....	836	13,006	5,615,707	14,244,503	25,513,180	11,268,677
1879.....	602	7,722	2,769,135	7,674,921	12,687,068	5,012,147
1869.....	696	5,303	2,068,318	4,590,062	8,964,903	4,374,841
1859.....	390	2,035	743,357	1,413,643	2,939,917	1,529,274

The most important statistics for the three classes of merchant establishments in the lumber industry, as reported at the censuses of 1909, 1904, and 1899, are given in Table 6. As already noted, custom mills were not segregated from merchant mills at censuses prior to that of 1899.

	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments.....	40,671	25,153	28,133	44.6	61.7	-10.6
Persons engaged in the industry.....	784,989	593,342	(²)	.....	32.3	.....
Proprietors and firm members.....	48,825	30,738	(²)	.....	58.8	.....
Salaried employees.....	41,145	30,038	20,940	96.5	37.0	43.4
Wage earners (average number).....	695,019	532,566	508,766	36.6	30.5	4.7
Primary horsepower.....	2,840,082	1,886,624	1,658,594	71.2	50.5	13.7
Capital.....	\$1,176,675,407	\$733,707,720	\$541,594,956	117.3	60.4	35.5
Expenses.....	995,622,839	738,032,608	621,135,272	60.3	34.9	18.8
Services.....	366,166,903	277,571,851	207,109,909	76.8	31.9	34.0
Salaries.....	47,427,696	31,737,491	18,714,931	153.4	49.4	69.6
Wages.....	318,739,207	245,834,360	188,394,978	69.2	29.7	30.5
Materials.....	508,117,579	360,324,949	364,993,841	39.2	41.0	-1.3
Miscellaneous.....	121,338,357	100,135,808	49,061,522	147.3	21.2	104.1
Value of products.....	1,156,128,747	884,267,009	760,992,360	51.9	30.7	16.2
Value added by manufacture (value of products less cost of materials).....	648,011,168	523,942,060	396,028,519	63.6	23.7	32.3

¹ A minus sign (-) denotes decrease. ² Comparable figures not available.

In general this table indicates a considerable growth during the decade. The relative increase in number of wage earners and value of products was much greater during the last half of the decade than during the first.

The very considerable increase in number of establishments shown by the census of 1909 results in part from the fact that the canvass of that year was more

ticularly than that of 1904. The additional establishments covered by this more complete canvass were for the most part small, however, so that the statistics for items other than number of establishments and number of proprietors and firm members are not materially affected.

Summary, by states.—Table 7 summarizes the more important statistics of the merchant establishments in the industry by states, the states being arranged according to the value of products reported for 1909.

The lumber industry is widely distributed throughout the United States, some establishments being reported for every state. Washington was in 1909 the most important state as measured by value of products and value added by manufacture, and ranked second in number of wage earners. New York, which ranked second among the states in value of products, was ninth in number of wage earners and fifth in value added by manufacture. Louisiana ranked third in value of products, but first in number of wage earners and second in value added by manufacture. The wide distribution of the industry is indicated by the fact that the five leading states reported only 26.9 per cent of the total number of wage earners and 29.8 per cent of the total value of products.

Of the 11 states that reported products valued at \$40,000,000 or over, Louisiana shows the most rapid development during the period 1899-1909, the number of wage earners increasing 202.3 per cent, the value of products 229 per cent, and the value added by manufacture 265.1 per cent. Still higher percentages of increase are shown for Idaho, Oklahoma, and New Mexico, in which states, however, the industry has attained comparatively little importance. Louisiana shows the largest relative increase in value of products for the five-year period 1904-1909 of any of the leading states (63.8 per cent), also showing the largest increase in number of wage earners (65.3 per cent).

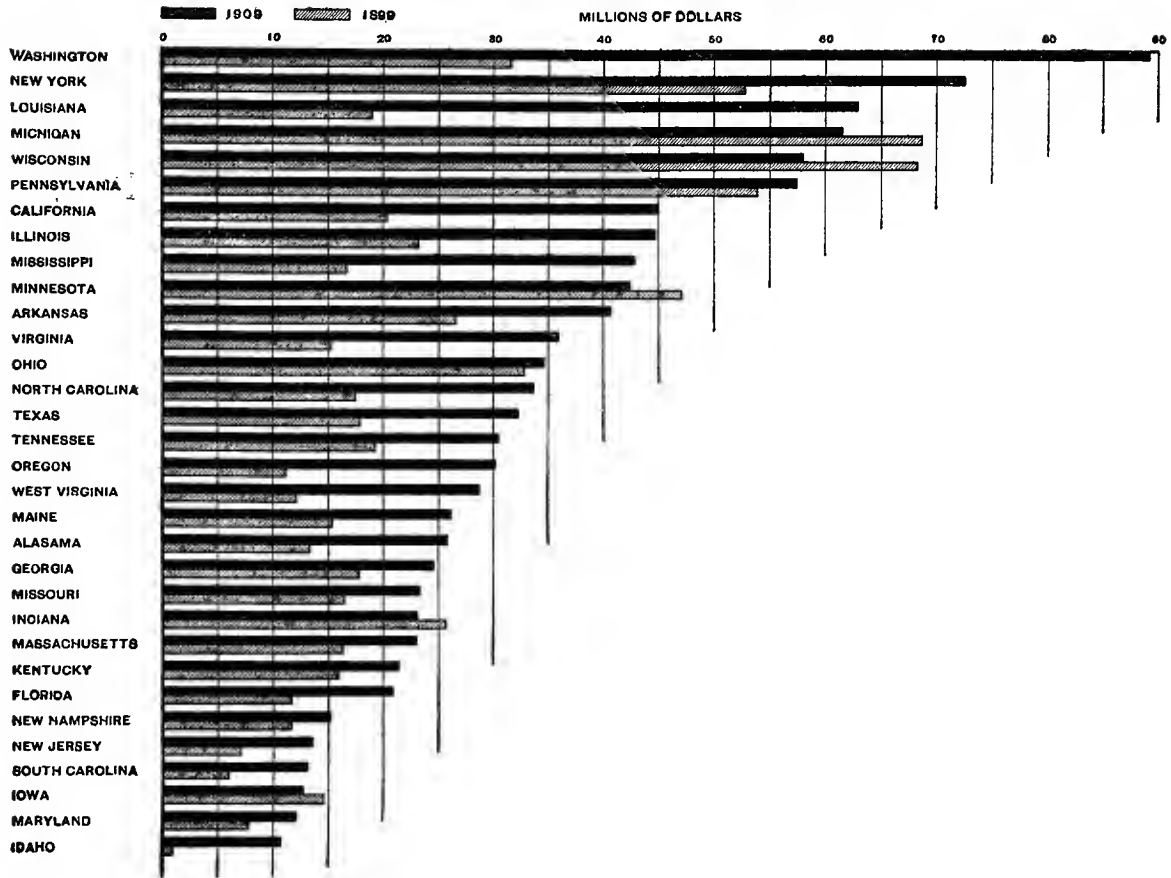
For the five-year period 1904-1909 three states show decreases in value of products and five states decreases in number of wage earners, the largest relative decrease in each case (9.3 per cent and 14.7 per cent, respectively) being reported for Vermont.

Ten states show decreases in number of wage earners, and five decreases in value of products and in value added by manufacture for the decade 1899-1909, the largest relative decrease in wage earners (29.1 per cent) being in Indiana and the largest in value of products (15.1 per cent) in Wisconsin.

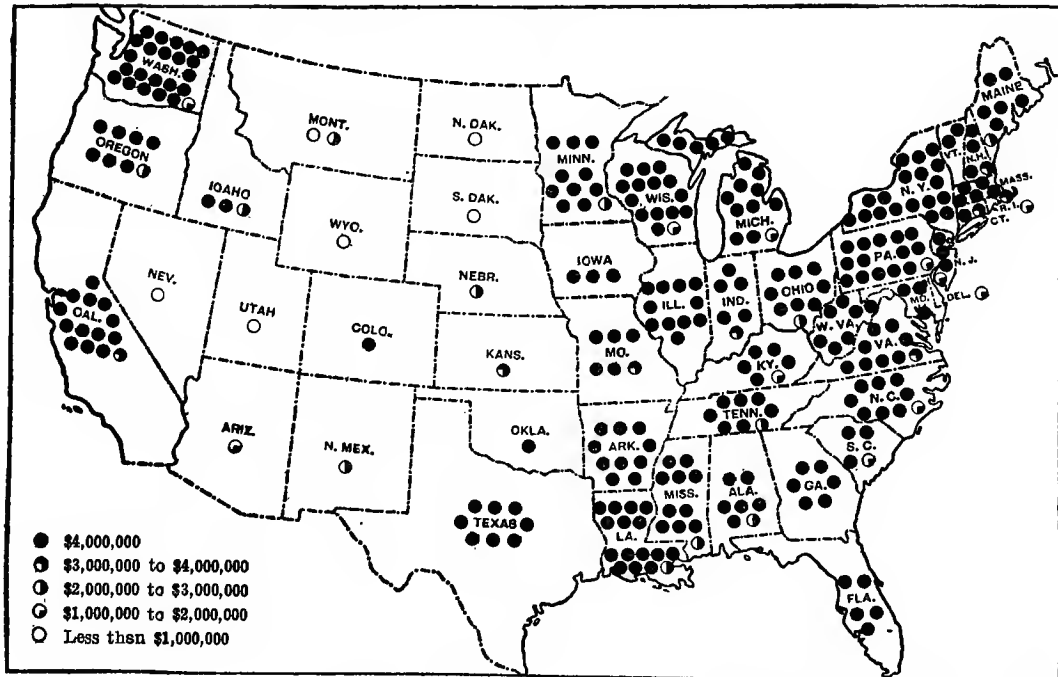
There was considerable change in the rank of the different states in value of products at the two censuses. Among the more important states in the industry, Washington advanced from fifth place in 1904 to first in 1909; Louisiana advanced from seventh to third place; and Mississippi from thirteenth to ninth. Wisconsin, which ranked second in value of products in 1904, had dropped to fifth place in 1909; Pennsylvania, which was fourth in 1904, had dropped to sixth in 1909; and Minnesota, which was sixth in 1904, was

MANUFACTURES.

VALUE OF PRODUCTS FOR LEADING STATES: 1909 AND 1899.



VALUE OF PRODUCTS, BY STATES: 1909.



PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 8 shows for 1909 the number of persons engaged in the operation of all merchant establishments in the industry, and of each of the three classes separately, classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN MERCHANT ESTABLISHMENTS: 1909		
	Total.	Male.	Female.
Lumber industry, all branches combined.....	784,989	777,030	7,959
Proprietors and officials.....	68,165	67,486	679
Proprietors and firm members.....	48,825	48,249	576
Salaried officers of corporations.....	6,616	6,523	93
Superintendents and managers.....	12,724	12,714	10
Clerks.....	21,805	18,088	3,717
Wage earners (average number).....	695,019	691,456	3,563
16 years of age and over.....	689,086	685,746	3,340
Under 16 years of age.....	5,933	5,710	223
Merchant sawmills and logging camps.....	613,601	610,126	3,475
Proprietors and officials.....	53,950	53,488	462
Proprietors and firm members.....	41,489	41,070	419
Salaried officers of corporations.....	3,574	3,536	38
Superintendents and managers.....	8,887	8,882	5
Clerks.....	12,473	10,949	1,524
Wage earners (average number).....	547,178	545,689	1,489
16 years of age and over.....	543,951	542,547	1,404
Under 16 years of age.....	3,227	3,142	85
Independent planing mills.....	132,511	129,845	2,566
Proprietors and officials.....	11,974	11,801	173
Proprietors and firm members.....	6,247	6,124	123
Salaried officers of corporations.....	2,563	2,518	45
Superintendents and managers.....	3,164	3,159	5
Clerks.....	8,145	6,291	1,854
Wage earners (average number).....	112,392	111,853	539
16 years of age and over.....	111,310	110,806	504
Under 16 years of age.....	1,082	1,047	35
Wooden packing-box factories.....	38,877	36,859	1,918
Proprietors and officials.....	2,241	2,197	44
Proprietors and firm members.....	1,089	1,055	34
Salaried officers of corporations.....	479	469	10
Superintendents and managers.....	673	673	.....
Clerks.....	1,187	848	339
Wage earners (average number).....	35,449	33,914	1,535
16 years of age and over.....	33,825	32,393	1,432
Under 16 years of age.....	1,624	1,521	103

The average number of persons engaged in the operation of merchant establishments during 1909 was 784,989, of whom 695,019, or 88.5 per cent, were wage earners, 68,165, or 8.7 per cent, proprietors and officials, and 21,805, or 2.8 per cent, clerks, this class including other subordinate salaried employees. Of the total number employed in the industry, 777,030, or 99 per cent, were males, and 7,959, or 1 per cent, females. The number of children under 16 years was 5,933, or less than 1 per cent of the total.

In the merchant sawmills and logging camps, 89.2 per cent of all persons engaged were wage earners, 8.8 per cent proprietors and officials, and 2 per cent clerks. The corresponding percentages for the independent planing mills were 84.8, 9, and 6.1, respectively, and for the wooden packing box factories, 91.2, 5.8, and 3.1, respectively.

Of the total number of women employed in the merchant establishments of the industry, 43.7 per cent were in the sawmills and logging camps, 32.2 per cent in the independent planing mills, and 24.1 per cent in the packing box factories. Of the children under 16 years, 54.4 per cent were in the sawmills and logging camps, 18.2 per cent in the independent planing mills, and 27.4 per cent in the packing box factories.

The average number of wage earners in each state for 1909, 1904, and 1899 is given in Table 23. The sex and age distribution of the average number is not shown for the individual states, but Table 24 gives such a distribution of the number employed on December 15, 1909, or the nearest representative day.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 9.

CLASS.	PERSONS ENGAGED IN MERCHANT ESTABLISHMENTS.				Percent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	784,989	100.0	583,342	100.0	32.3
Proprietors and firm members.....	48,825	6.2	30,738	5.2	58.8
Salaried employees.....	41,145	5.2	30,038	5.1	37.0
Wage earners (average number).....	695,019	88.5	532,566	89.8	30.5

Table 10 shows the average number of wage earners in merchant establishments distributed according to age and, in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN MERCHANT ESTABLISHMENTS.					
	1909		1904		1899	
	Number.	Percent distribution.	Number.	Percent distribution.	Number.	Percent distribution.
Total.....	695,019	100.0	532,566	100.0	508,766	100.0
16 years of age and over.....	689,086	99.1	526,936	99.0	502,335	98.7
Male.....	685,746	98.7	523,972	98.4	499,162	98.1
Female.....	3,340	0.5	3,014	0.6	3,173	0.6
Under 16 years of age.....	5,933	0.9	5,580	1.0	6,431	1.3

The number of women employed as wage earners in merchant establishments and the proportion which they formed of the total shows comparatively little change during the decade. The number of children employed shows a decrease for the decade as a whole, although somewhat larger in 1909 than in 1904; the proportion which they formed of the total, however, decreased during each intercensal period.

Wage earners in logging camps and merchant sawmills: 1909.—In view of the fact that logging camps and sawmills differ so widely in character of work and

in the conditions under which the work is done, statistics relative to the sex and age of the wage earners employed in each are presented in the following table:

Table 11										WAGE EARNERS EMPLOYED ON REPRESENTATIVE DAY IN LOGGING CAMPS AND MERCHANT SAWMILLS: 1909										WAGE EARNERS EMPLOYED ON REPRESENTATIVE DAY IN LOGGING CAMPS AND MERCHANT SAWMILLS: 1909									
STATE.	Total number.	In logging camps.				In mills.				STATE.	Total number.	In logging camps.				In mills.													
		16 years of age and over.		Under 16 years of age.		16 years of age and over.		Under 16 years of age.				16 years of age and over.		Under 16 years of age.		16 years of age and over.		Under 16 years of age.											
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.										
United States..	879,996	249,027	321	430	1	425,000	1,424	3,689	104	Montana.....	4,382	2,228	6	1	2,138	1	8												
Alabama.....	25,589	8,451		31		16,700	101	290	16	Nebbraska.....	8	2		1	5														
Arizona.....	904	302				599	1	2		Nevada.....	125	65			60														
Arkansas.....	38,022	10,173	1	4		27,529	13	299	3	New Hampshire..	8,666	4,250		2	4,396	14	4												
California.....	17,105	6,844	56	1		10,121	66	17		New Jersey.....	1,416	641			775														
Colorado.....	2,244	1,092	5			1,124	23			New Mexico.....	1,560	606			912		42												
Connecticut.....	2,476	1,304				1,172				New York.....	12,207	4,808	36		7,301	53	9												
Delaware.....	1,032	461				567		4		North Carolina..	37,771	13,870		26	23,554	16	305												
Florida.....	20,065	6,959	1	16		12,790	49	235	15	Ohio.....	8,007	1,912	9	1	6,046	38	1												
Georgia.....	23,184	7,903	6	24		15,101	24	121	5	Oklahoma.....	3,447	871		3	2,566	1	6												
Idaho.....	6,826	2,854	8	1		3,942	14	7		Oregon.....	15,964	4,500	21	1	11,402	35	5												
Illinois.....	4,091	602		6		3,444	8	31		Pennsylvania.....	20,895	8,916	14	4	11,910	10	41												
Indiana.....	8,785	1,103		1		7,557	31	90	3	Rhode Island.....	132	47			84														
Iowa.....	826	89				730	7			South Carolina..	16,996	6,880		23	9,891	2	200												
Kansas.....	10	4				6				South Dakota.....	585	199			385		1												
Kentucky.....	14,782	3,530		4		11,177	25	45	1	Tennessee.....	25,138	6,776	1	12	17,877	166	290												
Louisiana.....	49,386	14,831		58		34,190	35	272		Texas.....	25,592	8,124	1	60	17,133	7	267												
Maine.....	20,312	9,907	7	1		10,341	45	11		Utah.....	418	157	4		252	4	1												
Maryland.....	5,020	2,051	1	4		2,780	111	44	29	Vermont.....	5,426	1,969	12	16	3,416	5	8												
Massachusetts..	3,476	1,492		7		1,939	28	10		Virginia.....	36,679	14,943		32	21,136	151	417												
Michigan.....	34,628	15,639	46	5	1	18,815	58	62		Washington.....	48,786	16,532	56	5	32,021	140	32												
Minnesota.....	22,315	12,721	4			9,571	2	17		West Virginia...	20,032	9,665	6	34	10,242	6	79												
Mississippi.....	39,817	13,281	2	35		26,387	6	106		Wisconsin.....	32,102	15,760	18	1	16,122	69	123												
Missouri.....	11,968	3,193		8		8,518	57	185	7	Wyoming.....	801	520		2	276	1	2												

As would be expected from the nature of the work, a much larger proportion of the wage earners in the sawmills were women and children than was the case in the logging camps. In the latter they were principally employed in connection with cooking.

Wage earners employed in merchant establishments, by months.—Table 12 gives the number of wage earners employed in all merchant establishments in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 44 states in which an average of more than 500 wage earners were employed during the year.

There was comparatively little variation in the number of wage earners employed from month to

month. The largest number reported for any month of 1909 was 739,160, for November, and the smallest number 649,239, for January, the latter number being equal to 87.8 per cent of the maximum. In 1904 the maximum number, 553,017, was shown for October, and the minimum, 483,363, for January, the latter number being equal to 87.4 per cent of the former. For a large majority of the states shown in the table the time of maximum employment was in the fall and winter months.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for all the states in Table 24.

Prevailing hours of labor in merchant establishments.—In Table 14 the wage earners in merchant establishments have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Table 14

STATE.	AVERAGE NUMBER OF WAGE EARNERS IN MERCHANT ESTABLISHMENTS: 1909							
	In establishments with prevailing hours—							
	Total.	48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States....	695,019	23,315	17,418	41,713	49,986	469,292	90,983	2,312
Alabama.....	22,409	1,262	681	446	385	10,351	9,152	132
Arizona.....	839	11	7	7	7	821	.....	.....
Arkansas.....	32,932	484	1,130	382	515	29,329	925	167
California.....	22,935	3,859	68	2,709	228	14,732	1,324	15
Colorado.....	2,190	218	306	161	27	1,437	41	.....
Connecticut.....	3,495	365	317	1,248	113	1,452	.....	.....
Delaware.....	1,174	65	299	63	368	379	.....	.....
Florida.....	19,227	238	999	440	730	9,307	7,418	95
Georgia.....	22,257	865	732	144	875	14,722	4,437	482
Idaho.....	5,212	31	26	111	.....	4,965	69	10
Illinois.....	16,567	870	461	4,882	5,231	5,087	3	33
Indiana.....	10,317	260	447	1,051	1,156	7,401	2	.....
Iowa.....	4,658	12	11	525	582	3,312	216	.....
Kansas.....	982	42	3	134	321	482	.....	.....
Kentucky.....	13,042	643	863	889	670	9,761	161	55
Louisiana.....	46,072	380	259	852	300	25,985	18,184	112
Maine.....	15,086	30	129	1,061	1,320	8,784	3,758	4
Maryland.....	7,003	349	404	847	1,341	4,044	13	5
Massachusetts.....	8,976	1,058	987	1,793	3,600	1,486	41	11
Michigan.....	35,627	341	263	721	1,702	32,413	124	3
Minnesota.....	20,704	133	.....	226	442	19,574	324	5
Mississippi.....	33,397	487	311	496	1,241	16,323	14,477	62
Missouri.....	13,522	1,155	720	1,677	223	9,677	67	3
Montana.....	3,106	38	.....	1,551	9	1,367	141	.....
Nebraska.....	543	3	.....	148	261	131	.....	.....
New Hampshire.....	8,464	45	44	926	3,058	4,114	271	6
New Jersey.....	4,857	728	908	1,371	1,095	250	5	.....
New Mexico.....	1,475	148	16	19	.....	1,291	1	.....
New York.....	27,471	1,878	1,336	3,822	5,949	14,105	381	.....
North Carolina.....	34,001	733	729	257	2,645	22,838	6,540	293
Ohio.....	13,456	704	358	2,802	2,238	7,348	2	4
Oklahoma.....	3,175	800	180	155	156	1,631	253	.....
Oregon.....	15,066	360	105	243	186	13,766	393	13
Pennsylvania.....	26,873	790	995	4,105	3,984	12,975	3,822	202
Rhode Island.....	748	77	13	191	267	200	.....	.....
South Carolina.....	14,604	567	623	72	742	9,677	2,586	337
Tennessee.....	22,389	729	704	826	933	17,973	1,177	47
Texas.....	23,518	632	365	784	315	16,961	4,477	.....
Vermont.....	4,790	35	5	285	1,024	3,384	57	.....
Virginia.....	33,287	888	1,222	969	3,396	20,349	6,295	168
Washington.....	43,749	113	32	988	313	42,102	137	64
West Virginia.....	18,643	168	205	364	757	13,998	3,148	3
Wisconsin.....	34,093	230	74	808	1,202	31,217	547	15
Wyoming.....	648	8	10	6	4	611	9	.....

More than four-fifths (80.9 per cent) of the wage earners employed in the industry were in establishments where the prevailing hours were 60 or more per week. Of the seven groups shown in the table, by far the largest was that made up of the wage earners in establishments where the prevailing hours were 60 per week, such wage earners constituting 67.5 per cent of the total number. Sixty hours per week was the most common working time in 38 of the 44 states for which figures are given, while in Illinois, Massachusetts, Nebraska, and Rhode Island the most common

working time was 54 but less than 60 hours per week, and in Montana and New Jersey it was 54 hours per week.

CHARACTER OF OWNERSHIP OF MERCHANT ESTABLISHMENTS.

Table 15 presents statistics with respect to the character of ownership of the merchant establishments in the lumber and timber industry.

Table 15

CHARACTER OF OWNERSHIP.	MERCHANT ESTABLISHMENTS.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	40,671	25,153	\$1,156,128,747	\$884,287,009
Individual.....	22,466	12,402	199,498,587	163,470,134
Firm.....	11,218	17,829	162,652,128	1183,082,403
Corporation.....	6,969	4,900	793,810,129	536,795,071
Other.....	18	22	187,903	919,401
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	55.2	49.3	17.3	18.5
Firm.....	27.6	31.1	14.1	20.7
Corporation.....	17.1	19.5	68.7	60.7
Other.....	(2)	0.1	(2)	0.1

¹ Includes one establishment under an unclassified form of ownership, to avoid disclosure of individual operations.

² Less than one-tenth of 1 per cent.

Of the total number of merchant establishments reported for 1909, 17.1 per cent were under corporate ownership, as compared with 19.5 per cent in 1904, while the value of products of such establishments represented 68.7 per cent of the total in 1909 and 60.7 per cent in 1904.

Between 1904 and 1909 there was a decided decrease both in the relative number of establishments under firm ownership and in the proportion which they reported of the total value of products, while there was an increase in the relative number of establishments operated by individuals, but a slight decrease in their relative importance as measured by value of products. Of the 18 establishments operated under forms of ownership other than individual, firm, or corporate in 1909, 15 were controlled by cooperative associations.

Table 16 gives statistics for merchant establishments classified according to form of ownership for each state for which more than 500 wage earners were reported at the census of 1909. The 18 establishments under "other" forms of ownership have in this table been included with those under corporate ownership.

In 1909, 144,508 wage earners, or 20.8 per cent of the total, were employed in establishments under individual ownership; 105,536, or 15.2 per cent, in those under firm ownership; and 444,975, or 64 per cent, in those owned by corporations (including the few comparatively unimportant establishments operated by cooperative associations, etc.).

There is considerable variation among the states as to the relative importance of the establishments operated under the different forms of ownership. Thus in Washington, the leading state in the industry, establishments operated by corporations constituted

EXPENSES.

As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 6 shows the total expenses of merchant establishments in 1909 to have been \$995,622,839, distributed as follows: Cost of materials, \$508,117,579, or 51 per cent; wages, \$318,739,207, or 32 per cent; salaries, \$47,427,696, or 4.8 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, and insurance, traveling expenses, and other sundry expenses, \$121,338,357, or 12.2 per cent. Table 19 shows corresponding percentages for the three classes of merchant establishments.

There is comparatively little difference between planing mills and wooden packing box factories with respect to the relative importance of the several classes of expenses. In the case of sawmills and logging camps, however, the cost of materials represents a smaller proportion, and "miscellaneous expenses" and wages represent larger proportions of the total

expenses than in the case of either of the other two classes of establishments.

Table 19

	PER CENT OF TOTAL EXPENSES REPORTED FOR MERCHANT ESTABLISHMENTS: 1909			
	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.
Total	4.8	32.0	51.0	12.2
Sawmills and logging camps.....	4.7	37.7	42.0	15.6
Independent planing mills.....	5.1	22.0	66.8	6.2
Wooden packing box factories.....	4.1	22.3	67.5	6.1

Considerable variation appears in the proportions of total expenses represented by the different classes of expenses in the several states, as shown by the figures in table 24.

ENGINES, POWER, AND FUEL.

Engines and power.—The amount of power used in the lumber and timber product industry was first reported at the census of 1869. Table 2, which gives statistics for the industry as a whole, including the custom mills, shows that the total horsepower used increased from 716,113 in 1869, to 2,933,362 in 1909. Table 20 shows for the merchant establishments the statistics of power as reported at the censuses of 1909, 1904, and 1899.

Table 20

POWER.	MERCHANT ESTABLISHMENTS.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899 ¹	1909	1904	1899	1909	1904	1899
Primary power, total	58,665	33,400	.....	2,840,082	1,886,624	1,658,594	100.0	108.0	100.0
Owued	51,484	32,517	.....	2,767,454	1,859,187	(¹)	97.4	98.5	.....
Steam.....	45,877	28,762	.....	2,587,487	1,720,185	1,480,098	91.1	91.2	89.2
Gas.....	2,030	798	.....	38,628	16,897	² 16,820	1.4	0.9	1.0
Water wheels.....	3,541	2,947	.....	139,392	119,354	159,644	4.9	6.3	9.6
Water motors.....	36	10	.....	1,111	107	(³)	(⁴)	(⁴)	.....
Other.....	.....	.....	.....	836	2,644	(¹)	(⁴)	0.1	.....
Rented	5,181	883	.....	72,628	27,437	(¹)	2.6	1.5	.....
Electric.....	5,181	883	.....	62,200	14,181	2,032	2.2	0.8	0.1
Other.....	.....	.....	.....	10,428	13,256	(¹)	0.4	0.7	.....
Electric motors	8,815	1,757	.....	130,707	33,517	11,315	100.0	100.0	100.0
Run by current generated by establishment.....	3,634	874	.....	68,507	19,336	9,283	52.4	57.7	82.0
Run by rented power.....	5,181	883	.....	62,200	14,181	2,032	47.6	42.3	18.0

¹ Comparable figures not available.

² Includes other kinds of primary power.

³ Not reported.

⁴ Less than one-tenth of 1 per cent.

The total primary power used in merchant establishments increased from 1,658,594 horsepower in 1899 to 2,840,082 in 1909, or 71.2 per cent. In 1909, as in 1904 and 1899, most of the power employed in the industry was generated by steam engines, steam power representing 91.1 per cent of the total primary power in 1909, as compared with 89.2 per cent in 1899. The amount of steam power reported increased from 1,480,098 horsepower in 1899 to 2,587,487 horsepower in 1909, or 74.8 per cent. Water power ranks next to steam power in importance, but shows a decrease of

12.7 per cent for the decade, representing only 4.9 per cent of the total primary power in 1909, as compared with 9.6 per cent in 1899. The most notable increase during the decade is that for rented electric power, the amount reported in 1909 (62,200 horsepower) being over thirty times that reported for 1899. The number and horsepower of electric motors used for distributing power by means of current generated in the establishments also show a very great increase.

Table 21 shows, for 1909, by states, statistics of the power and of the fuel used in merchant establishments.

statistics of the output of the lumber industry as compiled at the censuses of 1904 and 1899. The statistics for 1899 in Table 22, however, include small custom mills, and are for this reason more nearly comparable with those for 1909 than are the figures for 1904, which are confined to the logging camps and merchant mills.

Since the nature of the products of the planing mills and box factories is such as not to permit of satisfactory reports in detail, the only products of the lumber industry for which figures are shown are lumber, lath,

and shingles. It will of course be understood that the value of products for 1909 in Table 22 represents only the value of rough lumber, lath, and shingles, while the value of products of the sawmill branch of the lumber industry as shown in Table 1 and other tables in this report covers, in addition to rough lumber and lath and shingles, dressed lumber, tight and slack cooperage stock, cross-ties, poles, posts, masts, spars, excelsior stock, etc., together with the products reported for the independent logging camps.

Table 22				Table 22			
PRODUCT.	1909	1904	1899	PRODUCT.	1909	1904	1899
Total value	\$724,705,760	\$465,153,662	\$414,058,487	Rough lumber—Continued.			
Rough lumber:				<i>Hardwoods—Continued.</i>			
Total quantity (M feet board measure).....	44,509,761	34,135,139	1 35,084,166	Maple—			
Total value.....	\$684,479,859	\$435,708,084	1 \$390,489,873	Quantity.....	1,106,604	587,558	633,466
<i>Softwoods—</i>				Value.....	\$17,447,814	\$8,780,727	\$7,495,052
Quantity.....	33,896,959	27,353,312	26,153,063	Red gum—			
Value.....	\$477,345,046	\$319,835,746	\$268,481,112	Quantity.....	706,945	523,990	285,417
Yellow pine—				Value.....	\$9,334,268	\$5,693,555	\$2,747,680
Quantity.....	16,277,185	11,521,781	9,658,548	Chestnut—			
Value.....	\$206,505,297	\$114,780,600	\$81,740,300	Quantity.....	663,891	243,537	206,688
Western pine—				Value.....	\$10,703,130	\$3,356,054	\$2,764,089
Quantity.....	1,499,985	1,290,526	944,560	Birch—			
Value.....	\$23,077,854	\$14,586,149	\$9,163,256	Quantity.....	452,370	224,009	132,601
White pine—				Value.....	\$7,666,186	\$3,459,501	\$1,657,621
Quantity.....	3,900,034	5,332,704	7,742,391	Basswood—			
Value.....	\$70,830,131	\$79,594,717	\$98,002,555	Quantity.....	399,151	228,041	308,069
Douglas fir—				Value.....	\$7,781,563	\$3,845,885	\$3,954,625
Quantity.....	4,856,378	2,928,409	1,736,507	Elm—			
Value.....	\$60,435,793	\$27,862,228	\$15,050,638	Quantity.....	347,456	258,330	456,731
Hemlock—				Value.....	\$6,088,098	\$3,732,609	\$5,240,530
Quantity.....	3,051,399	3,268,787	3,420,673	Cottonwood—			
Value.....	\$42,580,800	\$38,938,154	\$34,136,892	Quantity.....	265,600	321,574	415,124
Spruce—				Value.....	\$4,794,424	\$4,797,779	\$4,303,544
Quantity.....	1,748,547	1,303,886	1,448,091	Ash—			
Value.....	\$29,561,315	\$18,289,327	\$16,322,666	Quantity.....	291,209	169,178	269,120
Cypress—				Value.....	\$7,116,089	\$3,174,861	\$4,263,599
Quantity.....	955,635	749,592	495,836	Hickory—			
Value.....	\$19,549,741	\$13,115,339	\$6,604,495	Quantity.....	333,929	106,824	96,636
Redwood—				Value.....	\$10,283,776	\$2,557,601	\$1,814,500
Quantity.....	521,630	519,267	360,167	Walnut—			
Value.....	\$7,720,124	\$6,661,499	\$3,645,608	Quantity.....	46,108	31,455	38,681
Cedar—				Value.....	\$1,972,835	\$1,435,509	\$1,411,611
Quantity.....	346,008	223,035	232,978	Sycamore—			
Value.....	\$6,901,948	\$3,201,331	\$2,542,818	Quantity.....	56,511	18,002	29,715
All other—				Value.....	\$834,612	\$236,856	\$327,933
Quantity.....	740,158	215,325	113,312	All other—			
Value.....	\$10,182,043	\$2,806,402	\$1,271,884	Quantity.....	1,528,571	1,166,474	1,323,746
<i>Hardwoods—</i>				Value.....	\$32,599,949	\$23,969,098	\$19,662,279
Quantity.....	10,612,802	6,781,827	8,634,021	Lath:			
Value.....	\$207,134,813	\$115,872,338	\$116,817,192	Quantity (thousands).....	3,703,195	2,647,847	2,523,998
Oak—				Value.....	\$9,963,439	\$5,435,968	\$4,698,909
Quantity.....	4,414,457	2,902,855	4,438,027	Shingles:			
Value.....	\$90,512,069	\$50,832,303	\$61,174,129	Quantity (thousands).....	14,907,371	14,547,477	12,102,017
				Value.....	\$30,262,462	\$24,009,610	\$18,869,705

¹ Includes 297,082 M feet of lumber, board measure, valued at \$5,191,569, reported as "other sawed products," and not by kinds of wood.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the merchant establishments in the lumber industry are presented by states in Tables 23 and 24, Table 23 showing for 1909, 1904, and 1899 the number of merchant establishments in the industry, number of persons engaged, primary horsepower,

capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture, and Table 24 giving more detailed statistics for the merchant establishments for 1909 only.

Table 25 gives detailed statistics for 1909 for the mills engaged exclusively in custom sawing.

Table 24		PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Pri- mary horse- power.
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clarks.		Wage earners.			Total.	16 and over.		Under 16.			
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.		
								Maximum month.	Minimum month.							
1 United States	40,671	784,989	48,825	19,340	18,088	3,717	695,019	No 739,160	Ja 649,239	538,160	828,978	4,027	6,886	269	2,840,082	
2 Alabama	1,819	25,927	2,387	654	440	37	22,409	De 24,390	Je 20,803	27,224	26,661	126	406	31	102,527	
3 Arizona	23	911	30	16	20	6	839	Jy 1,043	Fe 545	997	994	1	2	.....	2,953
4 Arkansas	1,697	36,662	2,135	769	758	68	32,932	Oc 36,172	My 30,252	39,769	39,381	40	338	10	122,387	
5 California	644	25,079	547	647	799	151	22,935	Jy 28,986	Ja 14,401	24,795	24,588	148	59	.....	94,914
6 Colorado	263	2,614	261	81	77	5	2,190	Au ¹ 2,577	Ap 1,793	2,909	2,877	28	4	.....	11,177
7 Connecticut	393	4,219	443	110	109	62	3,495	De 4,039	Jy 2,850	4,400	4,344	41	15	.....	15,153
8 Delaware	116	1,369	148	35	10	2	1,174	Fe 1,338	Jy 968	1,540	1,477	46	14	3	3,767	
9 District of Columbia	10	339	12	3	14	1	309	Oc ¹ 333	Mh 287	308	307	.....	1	.....	501
10 Florida	515	20,893	580	549	509	28	19,227	De 20,651	Jy 18,222	21,666	21,328	50	273	15	65,097	
11 Georgia	1,826	25,491	2,271	537	391	35	22,257	De 24,410	Je 20,623	27,631	27,232	99	295	5	83,464	
12 Idaho	256	5,904	342	129	194	27	5,212	Oc 6,034	Ja 3,477	6,995	6,964	22	9	.....	32,342
13 Illinois	814	19,025	825	638	783	212	16,567	No 17,596	Ja 15,002	18,122	17,768	153	199	2	52,015	
14 Indiana	1,277	12,840	1,540	519	346	118	10,317	Oc 10,835	Ja 9,462	12,132	11,809	148	165	10	57,243	
15 Iowa	229	5,403	243	156	253	93	4,658	Jy 5,117	Ja 3,808	4,749	4,639	21	87	2	16,564	
16 Kansas	73	1,160	89	32	47	10	982	Au 1,032	Fe 891	1,016	989	2	25	.....	2,947
17 Kentucky	1,592	15,800	1,968	376	330	84	13,042	Oc 15,297	Ja 10,839	17,493	17,335	53	174	1	59,653	
18 Louisiana	702	49,535	652	1,010	1,665	136	46,072	Fe 49,316	Fe 43,932	51,645	51,202	55	382	6	150,286	
19 Maine	1,065	17,101	1,331	370	186	128	15,086	Ja 17,382	Au 12,146	22,401	22,286	80	34	1	95,363	
20 Maryland	561	8,165	718	220	193	31	7,003	De 7,612	Au 6,182	8,401	7,670	317	339	75	23,553	
21 Massachusetts	708	10,478	793	299	231	179	8,976	De 9,821	Au 8,101	10,577	10,176	316	80	5	44,784	
22 Michigan	1,180	39,011	1,310	962	844	268	35,627	De 37,468	Ap 33,004	43,689	43,300	217	167	5	133,739	
23 Minnesota	525	22,304	645	383	500	72	20,704	Ap 23,116	Ap 19,177	26,453	26,367	47	30	.....	67,836
24 Mississippi	1,647	37,118	2,117	798	747	59	33,397	No 36,622	My 30,493	41,281	41,128	8	145	.....	149,715
25 Missouri	1,098	15,814	1,289	508	400	95	13,522	No 14,925	Ja 12,671	16,142	15,763	88	284	7	49,506	
26 Montana	155	3,452	170	84	88	4	3,106	No 3,773	Ap 2,673	4,473	4,457	7	9	.....	14,337
27 Nebraska	48	707	43	27	82	12	543	Au 600	Fe 480	676	568	.....	8	.....	1,343
28 Nevada	9	224	5	11	19	3	186	Au 287	Fe 88	241	241	.....	.....	.....	563
29 New Hampshire	589	9,449	689	142	105	49	8,464	Fe 10,651	Au 6,164	11,229	11,037	138	38	18	44,593	
30 New Jersey	416	5,745	438	192	204	64	4,857	De 5,212	Ja 4,658	5,383	5,288	65	27	3	15,760	
31 New Mexico	76	1,620	84	34	23	4	1,475	Se 1,770	Fe 1,308	1,672	1,627	.....	45	.....	4,886
32 New York	2,263	32,458	2,619	1,014	1,127	327	27,471	Oc 28,802	Fe 25,959	31,926	31,631	208	87	.....	131,462
33 North Carolina	2,644	38,636	3,349	858	355	73	34,001	De 37,667	Je 31,962	41,763	41,159	55	530	19	115,542	
34 North Dakota	8	80	6	3	.....	.....	63	No 77	Ja 40	71	71	.....	.....	.....	249
35 Ohio	1,390	16,445	1,560	679	527	223	13,456	Oc 14,199	Ja 12,183	15,644	15,452	165	27	.....	69,255
36 Oklahoma	342	3,809	429	110	84	11	3,175	De 3,401	Ja 2,837	4,045	4,035	1	9	.....	12,397
37 Oregon	713	16,833	846	453	365	83	15,066	Je 16,462	Ja 11,645	17,572	17,501	59	12	.....	95,213
38 Pennsylvania	2,667	32,073	3,473	777	722	228	26,873	Da 28,690	Ja 24,194	32,915	32,429	123	356	7	113,412	
39 Rhode Island	87	880	59	31	30	12	748	Ap 834	Ja 673	806	803	2	1	.....	2,828
40 South Carolina	851	16,330	1,042	397	253	34	14,604	De 15,967	Jy 13,704	18,127	17,847	17	263	.....	49,400
41 South Dakota	58	534	52	18	10	3	451	No 562	Ja 331	668	666	.....	2	.....	2,200
42 Tennessee	1,977	26,283	2,683	623	504	84	22,389	No 25,462	Ja 20,620	28,603	28,032	182	373	16	83,382	
43 Texas	799	25,843	985	585	717	88	23,518	De 24,914	Fe 21,661	27,722	27,317	46	359	.....	86,031
44 Utah	104	629	150	27	16	5	431	Se 593	Fe 300	753	742	8	3	.....	2,922
45 Vermont	593	5,720	716	127	53	34	4,790	De 5,460	Au 3,866	6,668	6,550	94	24	.....	41,937
46 Virginia	2,617	37,931	3,479	670	425	70	33,287	No 35,949	Ja 28,919	40,692	39,875	187	630	.....	99,474
47 Washington	1,263	47,447	1,013	1,414	1,095	176	43,749	Oc 47,133	Ja 33,411	50,964	50,714	198	52	.....	224,455
48 West Virginia	1,018	20,799	1,226	440	403	78	18,643	Je 19,564	Ja 16,288	21,185	21,051	12	122	.....	62,356
49 Wisconsin	1,020	37,134	1,046	793	998	204	34,063	Fe 38,284	Ap 31,194	41,324	40,502	353	439	30	124,286	
50 Wyoming	63	766	85	18	14	1	648	Se 815	Fe 439	803	798	1	4	.....	2,251

¹ Same number reported for one or more other months.

THE LUMBER INDUSTRY.

DETAILED STATISTICS, BY STATES: 1909.

Capital.		EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1	\$1,176,675,407	\$995,622,839	\$29,448,332	\$17,979,364	\$316,739,207	\$5,082,287	\$503,035,292	\$2,623,146	\$9,883,384	\$32,491,242	\$76,380,585	\$1,156,128,747	\$648,011,168

LUMBER INDUSTRY, CUSTOM SAWMILLS—STATISTICS, BY STATES: 1909.

Table 25	STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
			Total.	Proprietors and firm members.	Salaries employed.	Wage earners (average number).							
	United States.....	4,133	12,836	5,702	44	7,090	93,280	\$5,655,145	\$8,900	\$1,687,252	\$37,574	\$4,515,881	\$4,418,307
	Alabama.....	55	237	113	1	123	1,302	52,867	200	18,325	1,385	55,271	53,886
	Arkansas.....	39	156	51	.....	105	970	46,700	.....	16,434	918	39,439	38,521
	Connecticut.....	31	86	35	.....	50	873	51,408	.....	19,478	1,045	46,481	45,436
	Delaware.....	21	93	26	.....	67	415	26,775	.....	11,371	845	25,605	24,760
	Florida.....	5	24	10	1	13	155	7,628	78	3,448	252	6,817	6,565
	Georgia.....	92	360	143	2	215	1,771	98,122	700	38,360	2,749	109,319	106,570
	Idaho.....	4	27	22	.....	5	111	9,110	.....	2,392	150	4,505	4,355
	Illinois.....	123	305	149	.....	156	2,244	139,731	.....	38,784	2,699	117,443	114,744
	Indiana.....	204	594	269	.....	325	4,298	237,931	.....	77,588	1,838	220,437	218,599
	Iowa.....	117	284	148	3	133	2,232	150,765	1,062	40,287	2,999	124,124	121,125
	Kentucky.....	294	1,009	381	2	626	5,650	294,594	653	114,763	6,092	326,563	320,471
	Louisiana.....	3	15	2	2	11	95	9,600	.....	3,804	213	6,090	5,877
	Maine.....	88	223	100	4	119	4,339	173,590	1,383	43,313	3,135	102,802	99,667
	Maryland.....	126	435	158	1	276	2,492	196,099	100	69,679	2,157	173,450	171,293
	Massachusetts.....	35	92	40	.....	52	1,512	78,685	.....	22,548	601	47,754	47,153
	Michigan.....	197	580	271	3	306	4,894	322,255	370	102,659	4,051	236,209	232,158
	Minnesota.....	137	367	244	.....	123	3,066	203,105	.....	45,250	2,001	132,283	130,282
	Mississippi.....	27	95	35	.....	60	663	26,600	.....	10,133	933	28,769	27,836
	Missouri.....	419	1,135	595	4	536	7,060	497,026	634	116,773	13,568	414,135	400,567
	Montana.....	14	43	19	.....	24	534	32,600	.....	8,741	670	24,249	23,579
	New Hampshire.....	42	94	46	1	47	1,970	91,373	35	21,941	956	49,201	48,245
	New Jersey.....	7	13	7	.....	6	213	22,625	.....	2,065	440	5,422	4,982
	New York.....	211	452	243	3	206	6,599	423,786	400	76,213	7,090	207,624	200,534
	North Carolina.....	191	811	300	5	506	3,641	214,394	498	82,774	5,821	209,665	203,844
	Ohio.....	262	732	340	1	391	5,398	336,846	150	107,849	3,930	286,189	282,209
	Oklahoma.....	4	12	5	.....	7	118	5,325	.....	1,908	65	4,725	4,660
	Oregon.....	4	13	5	.....	8	90	6,580	.....	4,614	135	8,144	8,009
	Pennsylvania.....	267	675	342	1	332	5,541	388,261	108	103,540	5,025	284,056	279,031
	Rhode Island.....	11	26	12	.....	14	410	19,500	.....	7,191	807	15,290	14,483
	South Carolina.....	73	271	100	1	170	1,358	66,358	500	25,347	1,745	62,273	60,528
	Tennessee.....	226	918	321	3	594	4,475	237,331	275	87,685	6,027	233,204	227,177
	Vermont.....	61	184	74	1	109	3,340	147,198	364	41,627	1,865	86,398	84,533
	Virginia.....	284	1,092	415	1	676	4,609	350,535	100	119,433	5,482	296,668	291,186
	Washington.....	10	25	13	.....	12	207	16,612	.....	7,442	167	13,970	13,803
	West Virginia.....	187	596	282	2	312	3,403	223,976	500	74,633	3,767	208,092	204,325
	Wisconsin.....	251	732	367	2	363	6,930	432,029	190	116,101	5,456	291,736	286,280
	Wyoming.....	4	10	8	.....	2	58	4,925	.....	698	215	4,960	4,745
	All other states.....	7	20	10	.....	10	244	12,300	.....	2,063	230	6,519	6,289

MUSICAL INSTRUMENTS
AND MATERIALS

THE MANUFACTURE OF MUSICAL INSTRUMENTS.

GENERAL STATISTICS.

The statistics relating to the manufacture of musical instruments are presented in the general report on manufactures for the United States as a whole under two main classifications: (1) "Musical instruments, pianos and organs and materials," and (2) "Musical instruments and materials, not specified." The prod-

ucts of the establishments assigned to these two classifications are so dissimilar that a combination of the totals would have little significance. The industry covered by the first-named classification is much the more important of the two and is therefore treated at greater length.

THE MANUFACTURE OF PIANOS AND ORGANS AND MATERIALS.

SUMMARY FOR THE UNITED STATES.

Summary for the three branches of the industry: 1909.—Table 1 presents a summary of the statistics of the piano and organ industry as a whole for 1909. It also distinguishes three classes of establishments, as follows: (1) Establishments whose chief products were pianos, (2) establishments whose chief products were organs, and (3) establishments whose chief products were piano and organ materials, such as cases, piano actions, sounding boards, keyboards, pipes, keys, strings, and washers.

Table 1	Total for the industry.	ESTABLISHMENTS MANUFACTURING PRINCIPALLY—		
		Pianos.	Organs.	Piano and organ materials.
Number of establishments . . .	507	294	86	127
Persons engaged in the industry . . .	41, 882	28, 415	2, 754	10, 713
Proprietors and firm members . . .	297	126	83	88
Salaried employees . . .	3, 565	2, 792	288	485
Wage earners (average number) . . .	38, 020	25, 497	2, 383	10, 140
Primary horsepower . . .	41, 623	23, 246	3, 334	15, 043
Capital . . .	\$103, 234, 301	\$81, 544, 094	\$4, 553, 609	\$17, 136, 598
Expenses . . .	80, 750, 525	59, 833, 694	4, 097, 384	16, 819, 447
Services . . .	28, 313, 754	20, 192, 875	1, 777, 649	6, 343, 230
Salaries . . .	5, 552, 136	4, 455, 598	349, 008	747, 580
Wages . . .	22, 761, 568	15, 737, 277	1, 428, 641	5, 595, 650
Materials . . .	43, 764, 737	32, 818, 770	1, 722, 923	9, 223, 044
Miscellaneous . . .	8, 672, 034	6, 822, 049	596, 812	1, 253, 173
Value of products . . .	1 89, 789, 544	66, 569, 273	4, 745, 655	18, 474, 616
Value added by manufacture (value of products less cost of materials) . . .	46, 024, 807	33, 750, 503	3, 022, 732	9, 251, 572

¹ In addition, parts and materials to the value of \$680,188 were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

The establishments in the first subclass manufactured chiefly upright and grand pianos with and without player attachments. Twenty of the establishments in this subclass also manufactured organs to the value of \$1,524,354; 23 manufactured player attachments to the value of \$1,474,630; 14 reported the manufacture of perforated music rolls to the value of \$212,925; and 46 made parts, materials, and supplies

to the value of \$2,112,320. Of the 86 establishments engaged chiefly in the manufacture of organs, there were 3 that also manufactured pianos to the value of \$188,321; 12 that manufactured parts, materials, and supplies to the value of \$330,291; and 3 that manufactured perforated music rolls to the value of \$3,225. The 127 establishments in the third subclass manufactured chiefly parts and materials used in the production of pianos and organs, but some of them made also parts and materials for other musical instruments. Because of this overlapping of the several branches of the industry, only combined totals for all three branches are presented in the tables in Volumes VIII and IX of the census reports.

The total value of products and the total cost of materials for the piano and organ industry as a whole contain considerable duplication, since the products of the establishments chiefly engaged in the manufacture of parts and supplies were largely used as materials by establishments manufacturing pianos and organs.

The establishments engaged primarily in the manufacture of pianos in 1909 turned out products to the value of \$66,569,273, or 74.1 per cent of the total value of products of the three branches of the industry combined. The value of the products reported by the establishments engaged chiefly in the manufacture of organs (\$4,745,655) represented 5.3 per cent of the total for all three branches, and the value of the products reported by the establishments engaged chiefly in the manufacture of piano and organ parts and materials (\$18,474,616) represented 20.6 per cent of the total value of products for the three branches.

The cost of the materials used in the three branches of the industry combined was \$43,764,737, which is equal to 48.7 per cent of the total value of products, while the value added by manufacture (that is, the value of products less the cost of materials) was \$46,024,807.

The establishments in the three branches of the industry combined gave employment to 41,882 persons, of whom 38,020 were wage earners, and paid out \$28,313,754 in salaries and wages. Of the total number of persons engaged, 67.8 per cent were employed in the piano branch of the industry, 6.6 per cent in the organ branch, and 25.6 per cent in the parts and materials branch.

Comparison with earlier censuses.—Table 2 summarizes the statistics for the manufacture of pianos and organs and piano and organ materials as reported at each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	PIANO AND ORGAN INDUSTRY.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1901-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	507	444	390	381	345	254	30.0	14.2	13.8	2.4	10.4	35.8
Persons engaged in the industry.....	41,882	36,106	23,217	(²)	(²)	(²)	80.4	16.0	55.5	.....	.....	.....
Proprietors and firm members.....	297	303	390	(²)	(²)	(²)	-23.8	-2.0	-22.3	.....	.....	.....
Salaried employees.....	3,565	2,722	1,518	(²)	(²)	(²)	134.8	31.0	79.3	.....	.....	.....
Wage earners (average number).....	38,020	33,081	21,309	17,040	10,777	6,108	78.4	14.9	55.2	25.1	(³)	(³)
Primary horsepower.....	41,623	30,134	20,789	11,067	(²)	1,456	100.2	38.1	45.0	87.8	.....	.....
Capital.....	\$103,234,301	\$68,481,910	\$43,810,481	\$28,321,160	\$13,791,915	\$8,203,161	135.6	50.7	56.3	54.7	105.3	68.1
Expenses.....	\$0,750,525	\$7,379,806	\$4,440,795	\$2,585,533	(²)	(²)	134.5	40.7	66.6	20.5	.....	.....
Services.....	28,313,754	22,255,008	13,557,489	12,444,206	6,805,732	4,475,657	108.8	27.2	64.2	8.9	82.8	52.1
Salaries.....	5,552,186	3,727,930	2,014,626	(²)	(²)	(²)	175.6	48.9	85.0	43.8	.....	.....
Wages.....	22,761,568	18,527,078	11,542,863	(²)	(²)	(²)	97.2	22.9	60.5	.....	.....	.....
Materials.....	43,764,737	27,986,627	17,370,685	13,925,499	7,975,451	3,901,895	151.9	56.4	61.1	24.7	74.6	104.4
Miscellaneous.....	8,672,034	7,138,171	3,512,621	2,215,828	(²)	(²)	146.9	21.5	103.2	58.5	.....	.....
Value of products.....	\$9,789,544	\$6,092,630	\$4,024,244	\$3,979,556	\$18,400,993	\$11,886,444	118.9	35.9	61.1	17.3	90.1	54.8
Value added by manufacture (value of products less cost of materials).....	46,024,807	38,106,003	23,653,559	21,054,057	10,425,542	7,984,549	94.6	20.8	61.1	12.3	101.9	30.6

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The manufacture of pianos and organs has had an uninterrupted development since 1869, when products to the value of \$11,886,444 were reported. In 1909 the value of products was more than seven times as great, \$89,789,544. The largest increases are shown for the decade from 1899 to 1909, when the number of persons engaged in the industry increased 80.4 per cent and the value of products 118.9 per cent. The large piano and organ factories are of comparatively recent development. In 1869 the average establishment gave employment to only 24 wage earners and the average value of products was \$46,797; in 1909 the average for wage earners was 75 and for value of products \$177,100.

The decrease in the number of proprietors and firm members is no doubt due to the growth in the corporate form of ownership. On the other hand, there was an increase of 134.8 per cent during the decade ending with 1909 in the number of salaried employees.

The censuses of 1909, 1904, and 1859 are the only censuses for which separate statistics are available for establishments whose chief products were pianos and organs, respectively, and the censuses of 1909 and 1904, the only ones for which separate statistics are available for establishments engaged chiefly in the manufacture of piano and organ parts and materials. The figures for the three classes of establishments at these censuses are summarized in Table 3.

	1909	1904	1859
<i>Establishments manufacturing principally pianos.</i>			
Number of establishments.....	294	249	110
Wage earners (average number).....	25,497	21,002	3,482
Wages.....	\$15,737,277	\$12,170,251	\$1,929,664
Cost of materials.....	32,818,770	19,587,770	1,727,885
Value of products.....	66,569,273	46,922,471	5,260,907
Value added by manufacture.....	33,750,503	27,334,701	3,533,022
<i>Establishments manufacturing principally organs.</i>			
Number of establishments.....	86	94	60
Wage earners (average number).....	2,383	3,623	716
Wages.....	\$1,428,641	\$2,034,559	\$343,116
Cost of materials.....	1,722,923	2,068,638	326,375
Value of products.....	4,745,655	6,041,844	971,725
Value added by manufacture.....	3,022,732	3,973,206	645,350
<i>Establishments manufacturing principally piano and organ materials.</i>			
Number of establishments.....	127	101	(¹)
Wage earners (average number).....	17,140	8,456	(¹)
Wages.....	\$5,595,650	\$4,322,268	(¹)
Cost of materials.....	9,223,044	6,330,219	(¹)
Value of products.....	18,474,616	13,128,315	(¹)
Value added by manufacture.....	9,251,572	6,798,096	(¹)

¹ Figures not available.

Summary, by states.—Table 4 summarizes the more important statistics for the establishments engaged in the manufacture of pianos and organs and materials, by states, the states being arranged according to the value of products reported for 1909.

In determining the rank of the states all states are considered, whether or not they are shown separately in the table; hence some omissions occur in the several series of numbers indicating rank, as certain states

included under "all other states" held a higher rank in some items than some of the states for which separate figures are given.

Although statistics are shown for 17 states separately, more than two-thirds (69 per cent) of the total value of products were reported by the first three states. New York reported 37.5 per cent of the total and Illinois 21.4 per cent. Wisconsin shows the greatest relative increase for the five-year period

1904-1909, advancing from fifteenth place in value of products in 1904 to twelfth place in 1909. Michigan also shows a marked gain in rank during this period, advancing from eighth to fifth. Most of the states held the same, or nearly the same, rank in 1909 as in 1904, and, in general, the states had in 1909 the same, or nearly the same, rank in number of wage earners and value added by manufacture as in value of products.

Table 4

PIANO AND ORGAN INDUSTRY.																						
STATE.	Number of establishments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹											
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Wage earners (average number).			Value of products.			Value added by manufacture.				
				1909	1904			1909	1904			1909	1904	1909	1904	1899-1909	1909-1904	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
		United States.	507	38,020	100.0	\$89,739,544	100.0	\$46,024,307	100.0	78.4	14.8	55.2	118.9	35.9	61.1	84.6	20.8	61.1
New York.....	184	11,938	31.4	1	1	33,679,953	37.5	1	1	16,185,206	35.2	1	1	75.5	24.2	41.4	128.4	44.0	58.6	97.8	30.1	52.0
Illinois.....	68	8,777	23.1	2	2	19,176,328	21.4	2	2	10,533,897	22.9	2	2	87.9	16.9	60.8	135.1	43.9	63.4	118.0	32.9	64.0
Massachusetts.....	59	4,245	11.2	3	3	9,106,470	10.1	3	3	4,957,214	10.8	3	3	33.7	1.8	31.4	47.5	10.0	34.1	28.1	-4.0	33.5
Connecticut.....	17	2,304	6.1	4	4	5,538,018	6.2	4	4	2,516,267	5.5	4	4	23.7	-10.8	38.6	63.1	5.0	55.3	37.8	-12.4	57.2
Michigan.....	17	1,779	4.7	6	8	4,226,266	4.7	5	8	2,216,791	4.8	5	8	134.1	66.4	40.7	258.1	113.0	68.1	214.0	79.7	74.8
Ohio.....	30	1,841	4.8	5	5	3,925,757	4.4	6	5	2,003,374	4.3	6	5	138.8	-16.7	186.6	170.6	6.6	153.9	170.4	-2.7	177.9
Indiana.....	15	1,667	4.4	7	7	3,685,962	4.1	7	6	1,982,923	4.3	7	6	288.6	.....	352.8	.....	.....	339.7	.....	.....	.....
Pennsylvania.....	30	1,182	3.1	9	9	2,381,849	2.7	8	9	1,133,504	2.5	9	10	67.2	.....	60.1	.....	.....	29.6	.....	.....	.....
New Jersey.....	18	1,393	3.7	8	6	2,229,145	2.5	9	7	1,153,072	2.5	8	7	82.6	.....	67.3	.....	.....	49.9	.....	.....	.....
Maryland.....	7	757	2.0	10	10	1,466,344	1.6	10	10	893,930	2.0	10	9	44.7	17.4	23.3	55.6	5.5	47.5	67.3	-21.4	112.8
Vermont.....	4	610	1.6	11	11	1,267,566	1.4	11	11	865,629	1.9	11	11	99.3	51.7	31.4	208.5	109.6	47.2	219.6	107.2	54.2
Wisconsin.....	11	369	1.0	12	16	892,957	1.0	12	15	402,796	0.8	12	18	.....	.....	385.3	.....	.....	.....	.....	.....	.....
Kentucky.....	6	343	0.9	13	12	588,352	0.7	13	12	316,617	0.7	13	12	.....	-4.7	.....	.....	.....	16.4	.....	.....	.....
Minnesota.....	5	143	0.4	15	17	294,452	0.3	15	16	168,013	0.4	15	15	.....	.....	.....	.....	.....	.....	.....	.....	.....
California.....	11	57	0.1	18	15	150,308	0.2	16	14	109,338	0.2	16	14	.....	-45.7	.....	.....	.....	-27.9	.....	.....	-21.6
Iowa.....	4	56	0.1	19	22	93,225	0.1	20	22	41,441	0.1	21	22	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine.....	3	20	0.1	22	19	43,274	(²)	22	19	24,525	0.1	22	19	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	18	539	1.4	.....	.....	1,043,318	1.2	.....	.....	514,270	1.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 20. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,00 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.

² Less than one-tenth of 1 per cent.

PERSONS ENGAGED IN THE INDUSTRY.

Summary, 1909.—Table 5 shows, for 1909, the number of persons engaged in the piano and organ industry as a whole and in each of the three branches, classified according to occupational status and sex,

and in the case of wage earners according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

Table 5

BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN THE INDUSTRY: 1909			BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.		Total.	Male.	Female.
Pianos and organs and materials.	41,832	39,005	2,877	Organs	2,754	2,592	162
Proprietors and officials.....	1,378	1,340	38	Proprietors and officials.....	175	168	7
Proprietors and firm members.....	297	285	12	Proprietors and firm members.....	83	78	5
Salaried officers of corporations.....	546	524	22	Salaried officers of corporations.....	42	40	2
Superintendents and managers.....	535	531	4	Superintendents and managers.....	50	50	.....
Clerks.....	2,484	1,788	696	Clerks.....	196	127	69
Wage earners (average number).....	38,020	35,877	2,143	Wage earners (average number).....	2,383	2,297	86
16 years of age and over.....	37,316	35,340	1,976	16 years of age and over.....	2,366	2,280	86
Under 16 years of age.....	704	537	167	Under 16 years of age.....	17	17	.....
Pianos	28,415	27,222	1,193	Piano and organ materials	10,713	9,191	1,522
Proprietors and officials.....	907	886	21	Proprietors and officials.....	296	286	10
Proprietors and firm members.....	126	121	5	Proprietors and firm members.....	88	86	2
Salaried officers of corporations.....	397	385	12	Salaried officers of corporations.....	107	99	8
Superintendents and managers.....	384	380	4	Superintendents and managers.....	101	101	.....
Clerks.....	2,011	1,483	528	Clerks.....	277	178	99
Wage earners (average number).....	25,497	24,853	644	Wage earners (average number).....	10,140	8,727	1,413
16 years of age and over.....	25,146	24,530	616	16 years of age and over.....	9,804	8,530	1,274
Under 16 years of age.....	351	323	28	Under 16 years of age.....	336	197	139

Of the 41,882 persons engaged in the industry during 1909, 38,020, or 90.8 per cent, were wage earners; 2,484, or 5.9 per cent, clerks, a class which includes other subordinate salaried employees; 1,081, or 2.6 per cent, salaried officials, superintendents, and managers; and 297, or seven-tenths of 1 per cent, proprietors and firm members.

Of the total number of wage earners, only 2,143, or 5.6 per cent, were females. The largest number of females, 1,413, or 65.9 per cent of the total, was reported for the manufacture of piano and organ materials. Females formed 13.9 per cent of the total number of wage earners in this branch of the industry. The total number of wage earners under 16 years of age (704) for the three branches of the industry combined formed but 1.9 per cent of the total number of wage earners in the industry as a whole, and was about equally divided between the piano branch and the piano and organ materials branch, only 17 being reported for the organ branch.

Comparison with previous censuses for the United States as a whole.—In order to compare the distribution of persons engaged in the industry in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 6 for the industry as a whole.

CLASS.	1909		1904		Per cent of increase 1904-1909. ¹
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	41,882	100.0	36,106	100.0	16.0
Proprietors and firm members...	297	0.7	303	0.8	-2.0
Salaried employees.....	3,565	8.5	2,722	7.5	31.0
Wage earners (average number).....	38,020	90.8	33,081	91.6	14.9

¹ A minus sign (-) denotes decrease.

Although there was an increase of 14.9 per cent in the average number of wage earners in the industry

as a whole from 1904 to 1909, they constituted a smaller proportion of the total number of persons engaged in 1909 than in 1904. There was an increase of 31 per cent in the number of salaried employees, but the number of proprietors and firm members decreased.

Table 7 shows the average number of wage earners in the industry as a whole, distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. The most important fact brought out by this table is the increase during the decade in the employment of female wage earners 16 years of age and over, this class forming 5.2 per cent of the total number of wage earners in 1909 as compared with 2.6 per cent in 1899.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	38,020	100.0	33,081	100.0	21,309	100.0
16 years of age and over.....	37,316	98.1	32,555	98.4	20,809	97.7
Male.....	35,340	93.0	31,322	94.7	20,254	95.1
Female.....	1,976	5.2	1,233	3.7	555	2.6
Under 16 years of age.....	704	1.9	526	1.6	500	2.3

The average number of wage earners employed in the industry in 1909, 1904, and 1899, is given for each state in Table 20. The average number distributed by sex and age is not shown for the individual states, but Table 21 gives such a distribution of the number employed on December 15, or the nearest representative day.

Wage earners employed, by months.—Table 8 gives, for the industry as a whole, the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 for the 11 states in which an average of 500 or more wage earners were employed during the year.

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	38,020	38,900	37,241	37,530	37,679	37,698	37,455	38,269	37,238	38,522	39,752	39,978	40,011
Connecticut.....	2,304	2,212	2,298	2,296	2,353	2,345	2,327	<i>2,188</i>	2,273	2,330	2,378	2,351	2,297
Illinois.....	8,777	<i>8,341</i>	8,346	8,434	8,524	8,649	8,629	8,708	8,877	9,031	9,293	9,290	9,196
Indiana.....	1,667	1,636	1,666	1,656	1,693	1,738	1,619	<i>1,613</i>	1,642	1,672	1,688	1,681	1,700
Maryland.....	757	<i>711</i>	728	734	738	760	761	772	764	758	772	787	792
Massachusetts.....	4,245	4,113	4,116	4,207	4,222	4,255	4,202	<i>4,087</i>	4,058	4,327	4,425	4,468	4,512
Michigan.....	1,779	<i>1,641</i>	1,680	1,713	1,739	1,726	1,747	1,687	1,821	1,840	1,875	1,927	1,956
New Jersey.....	1,393	1,407	1,423	1,438	1,406	1,402	1,425	1,349	<i>1,325</i>	1,341	1,394	1,382	1,417
New York.....	11,938	11,735	11,804	11,999	11,936	11,729	11,622	<i>11,181</i>	11,483	11,974	12,484	12,669	12,705
Ohio.....	1,841	1,792	1,853	1,840	1,859	1,827	1,862	<i>1,716</i>	1,801	1,820	1,853	1,924	1,845
Pennsylvania.....	1,182	1,151	1,160	1,148	1,167	1,209	1,183	<i>1,080</i>	1,149	1,227	1,241	1,235	1,284
Vermont.....	610	835	622	629	613	614	590	583	677	616	622	595	631

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

In the United States the largest number of wage earners employed in this industry during any month of 1909 was 40,011 in December, and the smallest num-

ber 36,269 in July, the minimum number being equal to 90.6 per cent of the maximum number. The industry is not subject to great fluctuations from month to

month, but, like most manufacturing industries, has its busier and its duller seasons, depending on the demands of the trade. In 1904 December was the month of greatest employment, with 35,143, and July the month of least employment, with 31,498. In 1909 December was the month of maximum employment in New York and Massachusetts, the first and third states in the industry, while October was the month of maximum employment in Illinois, the second state in importance. The months of maximum and minimum employment for 1909 and the number of wage earners reported for these months are given for each state in Table 21.

Prevailing hours of labor.—In Table 9 the wage earners in the industry as a whole, for the 11 leading states, are classified according to the prevailing hours of labor per week in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or a smaller number of hours.

Table 9 AVERAGE NUMBER OF WAGE EARNERS IN THE PIANO AND ORGAN INDUSTRY—ALL BRANCHES COMBINED: 1909

STATE.	Total.	In establishments with prevailing hours—				
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.
United States.....	38,020	1,270	2,534	17,372	6,055	10,789
Connecticut.....	2,304	.....	.....	750	356	1,198
Illinois.....	8,777	121	564	4,604	842	2,646
Indiana.....	1,667	.....	.....	.....	486	1,181
Maryland.....	757	2	.....	400	208	147
Massachusetts.....	4,245	700	420	2,855	195	75
Michigan.....	1,779	.....	1	51	1,106	621
New Jersey.....	1,993	64	5	978	345	1
New York.....	11,938	364	1,481	6,967	649	2,477
Ohio.....	1,841	.....	3	219	782	337
Pennsylvania.....	1,182	.....	32	395	492	263
Vermont.....	610	.....	.....	4	340	266

Of the wage earners, 34,216, or 90 per cent, were employed in establishments in which the prevailing hours of employment were either 54, between 54 and 60, or 60 per week. The largest number of wage earners, 17,372, or 45.7 per cent of the total, were employed in establishments operating 54 hours per week.

In five of the eleven states for which separate data are shown, 54 hours per week was the most common period of employment, these states including the three leading states in the industry, New York, Illinois, and Massachusetts.

CHARACTER OF OWNERSHIP.

Table 10 presents statistics with respect to the character of ownership of establishments in the piano and organ industry.

Table 10 PIANO AND ORGAN INDUSTRY.

CHARACTER OF OWNERSHIP.	PIANO AND ORGAN INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	507	444	\$89,789,544	\$86,092,630
Individual.....	125	142	7,923,369	6,354,759
Firm.....	68	168	4,900,983	15,900,439
Corporation.....	314	234	76,965,192	53,837,432
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	24.7	32.0	8.8	9.6
Firm.....	13.4	15.3	5.5	18.9
Corporation.....	61.9	52.7	85.7	81.5

¹ Includes figures for one establishment reported as under "other" ownership, to avoid disclosure of individual operations.

The most important distinction shown is that between corporate and all other forms of ownership. In 1909, of the total number of establishments, 61.9 per cent were under corporate ownership, as compared with 52.7 per cent in 1904. While corporations thus controlled less than two-thirds of the total number of establishments in both years, the value of the products of these establishments represented 85.7 per cent of the total for the industry in 1909 and 81.5 per cent in 1904. Between 1904 and 1909 there was an actual decrease in the number of establishments under individual ownership, but an increase in the value of their products. The number of establishments under firm ownership was practically the same at the two censuses, but there was an absolute decrease of \$999,456, or 16.9 per cent, in the value of their products from 1904 to 1909.

Table 11 gives, for 1909, statistics for establishments classified according to form of ownership for each of the 11 states in which more than 500 wage earners were employed in this industry.

In 1909, of the entire number of wage earners, 2,751, or 7.2 per cent of the total, were employed in establishments under individual ownership; 2,547, or 6.7 per cent, in those under firm ownership; and 32,722, or 86.1 per cent, in those controlled by corporations. Corporations do by far the greater part of the business in each of the 11 states for which figures are presented. In New York establishments under individual ownership reported 17.1 per cent of the total value of products for the state, and those under firm ownership 8.5 per cent, these percentages being higher than those for the corresponding classes of establishments in any other state listed.

Table 11

STATE.	PIANO AND ORGAN INDUSTRY.											
	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	125	68	314	2,751	2,547	32,722	\$7,923,369	\$4,900,983	\$76,965,192	\$3,603,274	\$2,803,119	\$39,613,414
Connecticut.....	2	1	14	29	(X)	2,275	65,726	(X)	5,472,292	45,358	(X)	2,470,909
Illinois.....	9	4	55	116	64	8,597	250,434	314,353	18,611,541	105,440	176,200	10,252,257
Indiana.....	4	.....	11	21	.....	1,646	52,466	.....	3,633,496	29,387	.....	1,953,536
Maryland.....	4	2	1	(X)	(X)	757	(X)	(X)	1,466,344	(X)	(X)	839,930
Massachusetts.....	17	7	35	475	206	3,564	1,080,176	282,555	7,743,739	490,200	165,659	4,301,355
Michigan.....	2	3	12	(X)	78	1,701	(X)	249,080	3,977,186	(X)	102,202	2,114,589
New Jersey.....	4	1	13	47	(X)	1,346	51,261	(X)	2,177,884	51,262	(X)	1,121,810
New York.....	55	26	103	1,744	1,612	8,582	5,744,849	2,861,525	25,073,579	2,462,897	1,719,915	12,002,394
Ohio.....	4	6	20	30	66	1,745	63,900	129,156	3,732,701	41,603	81,493	1,880,278
Pennsylvania.....	8	6	16	57	74	1,051	98,399	172,616	2,110,534	65,575	94,359	973,570
Vermont.....	.....	.....	4	.....	.....	610	.....	.....	1,267,566	.....	.....	865,629

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under another form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

SIZE OF ESTABLISHMENTS.

Classification according to value of products.—Table 12, relating to the entire industry in the United States as a whole, presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

Table 12

VALUE OF PRODUCTS PER ESTABLISHMENT.	PIANO AND ORGAN INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	507	444	\$39,789,544	\$66,092,630
Less than \$5,000.....	53	52	168,073	199,761
\$5,000 and less than \$20,000.....	85	84	900,917	945,116
\$20,000 and less than \$100,000.....	166	132	8,952,604	6,773,545
\$100,000 and less than \$1,000,000.....	193	171	63,736,264	50,139,758
\$1,000,000 and over.....	10	5	16,031,686	2 6,837,938
Percent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	10.5	11.7	0.2	1 0.2
\$5,000 and less than \$20,000.....	16.8	18.9	1.0	1.4
\$20,000 and less than \$100,000.....	32.7	29.7	10.0	10.2
\$100,000 and less than \$1,000,000.....	38.1	38.5	71.0	75.9
\$1,000,000 and over.....	2.0	1.1	17.9	2 10.3

¹ Excluding figures for 18 establishments, to avoid disclosure of individual operations.
² Excluding figures for 1 establishment, to avoid disclosure of individual operations.

Of the 507 establishments reported in 1909, there were only 10 whose products were valued at \$1,000,000 or over, but such establishments reported 17.9 per cent of the total value of products. In 1909 establishments reporting products valued at \$100,000 but less than \$1,000,000 constituted 38.1 per cent of the total number and contributed 71 per cent of the total value of products.

The average value of products per establishment for the industry as a whole increased from \$148,857 in 1904 to \$177,100 in 1909. In 1909 the average value of products for the several branches of the industry were as follows: Pianos, \$226,426; organs, \$55,182; piano and organ materials, \$145,469. In 1904, the corresponding averages were \$188,444, \$64,275, and \$129,983.

Classification according to number of wage earners.—Table 13 gives for 1909 a classification of the establishments engaged in the industry as a whole according to the number of wage earners and shows the average number of wage earners employed by establishments of each group in each of the 11 states in which 500 or more wage earners were employed.

Table 13

STATE.	PIANO AND ORGAN INDUSTRY: 1909																		
	Total.		Establishments employing—																
			No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States.....	507	38,020	12	100	242	123	1,577	96	3,221	63	4,633	74	12,017	31	10,266	7	4,541	1	1,524
Connecticut.....	17	2,304	.....	.....	.....	4	35	3	111	3	203	4	734	2	610	1	611	.....	.....
Illinois.....	68	8,777	1	3	23	17	223	14	471	6	423	12	1,979	7	2,601	2	1,533	1	1,524
Indiana.....	15	1,667	.....	3	8	2	25	1	47	4	289	3	518	1	253	1	527	.....	.....
Maryland.....	7	757	1	2	4	.....	.....	1	35	.....	.....	2	318	1	400	.....	.....	.....	.....
Massachusetts.....	59	4,245	4	13	31	8	105	8	248	9	674	13	1,967	4	1,220	.....	.....	.....	.....
Michigan.....	17	1,779	1	2	5	2	26	1	50	4	306	5	705	2	687	.....	.....	.....	.....
New Jersey.....	18	1,393	1	3	7	2	28	4	146	4	279	3	587	1	346	.....	.....	.....	.....
New York.....	184	11,938	1	32	71	51	655	40	1,343	27	1,981	23	3,655	7	2,363	3	1,870	.....	.....
Ohio.....	30	1,841	1	4	11	12	152	5	143	2	189	4	719	2	627	.....	.....	.....	.....
Pennsylvania.....	30	1,182	2	6	16	10	118	8	259	1	56	1	149	2	584	.....	.....	.....	.....
Vermont.....	4	610	.....	1	4	.....	.....	1	32	.....	.....	.....	.....	2	574	.....	.....	.....	.....

Of the 507 establishments reported for the industry as a whole, 12, or 2.4 per cent, employed no wage earners, 62.9 per cent employed from 1 to 50 wage earners, 27 per cent employed from 51 to 250, and 7.7 per cent employed over 250.

Of the total number of wage earners, 43 per cent were reported by establishments employing more than 250 wage earners each, 31.6 per cent by establishments employing from 101 to 250 wage earners, 20.7 per cent by those employing from 21 to 100, and 4.8 per cent by those employing from 1 to 20.

EXPENSES.

As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation, and consequently can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 2 shows the total reported expenses in the combined industry to have been \$80,750,525, distributed as follows: Cost of materials, \$43,764,737, or 54.2 per cent; wages, \$22,761,568, or 28.2 per cent; salaries, \$5,552,186, or 6.9 per cent; and miscellaneous expenses, made up of traveling expenses, advertising, ordinary repairs of buildings and machinery, insurance, and other sundry expenses, \$8,672,034, or 10.7 per cent. These proportions, as may be seen by comparing the figures for the different items in Table 21, vary somewhat in the several states, owing in a measure to differences in the branch of the industry which predominates.

The percentages represented by the several classes of expenses are shown for each of the three branches of the industry in Table 14.

BRANCH.	PER CENT OF TOTAL EXPENSES CONSISTING OF—			
	Cost of materials.	Salaries.	Wages.	Miscellaneous expenses.
All branches combined.....	54.2	6.9	28.2	10.7
Pianos.....	54.8	7.4	26.3	11.4
Organs.....	42.0	8.5	34.9	14.6
Piano and organ materials.....	54.8	4.4	33.3	7.5

ENGINES, POWER, AND FUEL.

Engines and power.—Table 15 shows the number of engines or other motors, according to their character,

employed in generating power (including electric motors operated by purchased current), and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments using them.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
	Primary power, total.....	1,144	539	265	41,623	30,134	20,789	100.0	100.0	100.0
Owned.....	390	329	265	35,702	27,314	19,444	85.8	90.6	93.5
Steam.....	299	263	219	33,314	25,700	18,258	80.0	85.3	87.8
Gas.....	55	37	20	1,271	741	311	3.1	2.5	1.5
Water wheels.....	30	22	24	1,015	802	872	2.4	2.7	4.2
Water motors.....	6	7	(1)	91	65	(1)	0.2	0.2	—
Other.....	—	—	2	11	6	3	(2)	(2)	(2)
Rented.....	754	210	(1)	5,921	2,820*	1,345	14.2	9.4	6.5
Electric.....	754	210	(1)	5,355	1,932	493	12.9	6.4	2.4
Other.....	—	—	—	566	888	852	1.4	2.9	4.1
Electric motors.....	1,682	442	26	13,256	5,085	1,457	100.0	100.0	100.0
Run by current generated by establishment.....	908	232	26	7,901	3,153	964	59.6	62.0	66.2
Run by rented power.....	754	210	(1)	5,355	1,932	493	40.4	38.0	33.8

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power reported for the industry increased from 20,789 horsepower in 1899 to 41,623 in 1909, an increase of 20,834 horsepower, or 100.2 per cent. The greater part of the increase was in the power of steam engines. There was a considerable increase in rented electric power, which formed 12.9 per cent of the total primary power in 1909, as against 2.4 per cent in 1899. The power of gas and other internal combustion engines and of water wheels used is relatively small, and although the combined total for these forms of power increased considerably during the decade 1899-1909, their proportion of the total primary power remained practically the same. The number and horsepower of electric motors used for distributing power by means of current generated in the establishments shows a great increase during the decade.

Table 16 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the combined industry in the 11 leading states.

Table 16

PIANO AND ORGAN INDUSTRY: 1909

STATE.	Number of establishments reporting.	Total horsepower.	Primary horsepower.					Electric horsepower.		Fuel used.									
			Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.		Generated in the establishment reporting.		Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec.	Other.	Anthracite (long tons).	Bituminous (short tons).								
United States.....	430	41,623	35,702	33,314	1,271	1,106	11	5,355	566	13,256	7,901	37,796	202,934	4,930	789	1,457	46,888		
Connecticut.....	17	2,559	2,301	1,951	15	325	10	258	23	1,017	759	4,185	9,955	.....	3	.....	500
Illinois.....	64	8,123	7,508	7,378	79	50	1	592	.....	2,576	1,984	2,406	83,988	.....	6	403	448
Indiana.....	14	2,650	2,274	2,268	6	.....	.....	376	.....	811	435	.....	18,761	.....	.....	25	200
Maryland.....	4	613	610	.....	225	.....	.....	3	.....	438	435	1,613	.....	60	620	.....	.....
Massachusetts.....	54	4,454	4,197	3,970	52	175	.....	195	62	933	738	1,652	17,852	678	515	64	779	
Michigan.....	16	2,690	2,670	2,640	.....	30	.....	2	18	369	367	88	19,414	50	.....	6	.....	
New Jersey.....	15	1,121	948	940	.....	8	.....	152	21	642	490	3,110	5,125	566	10	241	98
New York.....	138	10,905	8,938	8,605	170	163	.....	1,550	417	3,184	1,634	23,062	26,120	1,338	83	19	4,673	
Ohio.....	30	2,254	1,366	870	496	.....	.....	888	.....	1,189	301	7	6,061	2,284	73	33	32,776
Pennsylvania.....	24	1,260	958	819	139	.....	.....	302	.....	588	286	1,560	3,767	.....	1	.....	4,421
Vermont.....	4	1,968	1,430	1,265	.....	165	.....	536	.....	572	36	35	2,168	.....	4	.....	462
All other states.....	50	3,028	2,502	2,223	89	190	.....	501	25	937	436	78	7,712	14	34	46	2,631	

Of the 507 establishments in the industry as a whole 430, or 84.8 per cent, reported power. The three leading states in the industry—New York, Illinois, and Massachusetts—together reported 56.4 per cent of the total horsepower. Steam power was the most important in all of the states for which separate figures are shown, except for Ohio, in which state rented electric power was slightly more important. Ohio led in the horsepower reported for gas and other internal combustion engines, with 39 per cent of the total.

Fuel consumed.—In the industry as a whole and in each of the states for which figures are given separately in the table, bituminous coal was the principal fuel used, a total of 202,934 tons being consumed in 1909. Illinois was the largest user of this fuel, consuming 83,988 tons, or 41.4 per cent of the total. New York consumed 23,062 tons of anthracite coal, or 61 per cent of the total. Ohio consumed 69.8 per cent of the gas reported for the industry.

PRODUCTS.

The special schedule used in collecting the statistics for the piano and organ industry at each of the last three censuses required a detailed statement of the number and value of the different kinds of pianos and organs manufactured. In the tables which follow, the statistics cover the instruments made in all three branches of the industry.

Production of pianos.—Table 17 shows the number and value of the upright and grand pianos made in the United States and in five of the leading states in 1909, 1904, and 1899, respectively.

There has been a steady increase in the number and value of both upright and grand pianos manufactured since 1899. Of the total number of pianos

reported in 1909, 97.7 per cent were uprights. Of their total value, that of the uprights represented 93.2 per cent. The total production of pianos of both kinds reported in 1909 was 374,154, valued at \$59,501,225, an increase in number of 203,143, or 118.8 per cent, and in value of \$32,498,373, or 120.4 per cent, over the totals for 1899. Upright pianos show the greater percentage of increase in number, but grand pianos show the greater percentage of increase in value.

Table 17

	Census.	PIANOS.				
		Total value.	Upright.		Grand.	
			Number.	Value.	Number.	Value.
United States.....	1909	\$59,501,225	365,413	\$55,462,656	8,741	\$4,038,669
	1904	41,476,479	253,825	37,816,066	7,372	3,661,423
	1899	27,002,852	166,760	26,301,432	4,251	1,701,420
Per cent of total.	1909	100.0	97.7	93.2	2.3	6.8
	1904	100.0	97.2	91.2	2.8	8.8
	1899	100.0	97.5	93.7	2.5	6.3
Increase for decade.....		\$32,498,373	198,653	\$30,161,124	4,490	\$2,337,249
Per cent.....		120.4	119.1	119.2	105.6	137.4
Connecticut.....	1909	\$1,716,695	9,759	\$1,716,695	(²)	(²)
	1904	1,238,667	9,221	1,231,242	19	7,425
	1899	944,994	7,259	941,344	10	3,650
Illinois.....	1909	14,783,394	107,903	14,646,471	380	136,923
	1904	9,696,142	73,899	9,614,431	238	81,711
	1899	5,691,747	46,024	5,643,287	110	48,460
Massachusetts....	1909	5,328,716	25,644	4,411,927	2,533	916,789
	1904	5,129,833	20,967	4,022,237	2,159	1,107,596
	1899	3,566,662	15,872	3,177,217	937	389,445
New York.....	1909	23,771,763	137,091	21,401,242	4,298	2,370,521
	1904	16,684,911	98,491	14,819,717	3,541	1,865,194
	1899	11,862,257	69,274	10,899,392	2,581	962,865
Ohio.....	1909	1,901,294	11,118	1,778,629	229	122,665
	1904	1,855,610	11,119	1,782,910	160	72,700
	1899	1,214,068	8,696	1,150,293	166	63,775
All other states....	1909	11,999,363	73,898	11,507,592	1,301	491,771
	1904	6,871,316	40,128	6,344,519	1,255	526,797
	1899	3,723,124	19,635	3,489,899	447	233,225

¹ Does not include value of grand pianos. ² Included in "all other states."

New York and Illinois were two the principal states in the manufacture of upright pianos at each of the three censuses covered by the table. In 1909, the number reported for these two states combined (244,994) formed 67 per cent of the total for the United States. In the manufacture of grand pianos, New York and Massachusetts were the two most important states, reporting in 1909, 6,831, or 78.1 per cent of the total number.

Table 18 shows, by states, for 1909 the number and value of the upright pianos for or with player attachments and without player attachments, of grand pianos, and of player attachments made separate.

	PIANOS AND PIANO-PLAYER ATTACHMENTS: 1909	
	Number.	Value.
Pianos.....	374,154	\$59,501,225
Upright.....	365,413	55,462,556
Without player attachments.....	330,918	46,187,555
Connecticut.....	7,438	1,023,254
Illinois.....	103,433	13,226,811
Indiana.....	21,204	2,781,512
Maryland.....	2,740	556,728
Massachusetts.....	25,049	4,265,661
Michigan.....	23,001	3,045,682
Minnesota.....	683	107,712
New Jersey.....	3,521	557,736
New York.....	118,174	16,777,094
Ohio.....	9,403	1,329,671
Pennsylvania.....	8,565	1,570,874
Wisconsin.....	4,685	522,475
All other states.....	3,016	422,345
For or with player attachments.....	34,495	9,275,001
Illinois.....	4,470	1,419,660
Indiana.....	1,687	537,678
Maryland.....	431	119,727
Massachusetts.....	595	146,266
Michigan.....	2,164	687,291
New York.....	18,917	4,624,148
Ohio.....	1,715	448,958
Pennsylvania.....	741	213,346
All other states.....	3,775	1,077,927
Grand.....	18,741	14,038,669
Illinois.....	980	136,923
Massachusetts.....	2,533	916,789
New Jersey.....	60	20,623
New York.....	4,298	2,370,521
Ohio.....	229	122,665
Pennsylvania.....	96	33,850
All other states.....	1,145	437,298
Player attachments made separate from pianos.....	10,898	1,474,630
Illinois.....	464	34,908
New York.....	2,789	829,406
All other states.....	7,645	610,317

¹ Includes a few pianos with player attachments.

Of the total number of upright pianos manufactured, 34,495, or 9.4 per cent, were for or with player attachments. The value of the instruments for or with player attachments formed 16.7 per cent of the total value of upright pianos. New York reported 18,917, or 54.8 per cent, of the upright pianos for or with player attachments.

Of the 10,898 player attachments which were not attached to pianos, 2,789, or 25.6 per cent, were reported by establishments located in New York, but the value of the attachments made in New York was more than half of the total for the country, which was \$1,474,630.

Production of organs.—Table 19 shows the number and value of the reed and the pipe organs reported for the United States and for seven of the leading states in the industry in 1909, 1904, and 1899.

	Census.	ORGANS.			
		Reed.		Pipe.	
		Number.	Value.	Number.	Value.
United States.....	1909	64,111	\$2,595,429	1,224	\$2,713,587
	1904	113,065	4,162,053	901	1,989,979
	1899	106,694	4,040,240	564	1,177,021
Per cent of total.....	1909	98.1	48.9	1.9	51.1
	1904	99.2	67.7	0.8	32.3
	1899	99.5	77.4	0.5	22.6
Increase for decade ¹		-42,583	-\$1,444,811	660	\$1,536,566
Per cent of increase ¹		-39.9	-35.8	117.0	130.5
Illinois.....	1909	28,644	\$973,783	154	\$307,632
	1904	55,619	1,739,220	140	230,323
	1899	52,307	1,668,043	87	105,157
Massachusetts.....	1909	(²)	(²)	151	339,693
	1904	2,073	150,883	137	520,887
	1899	3,323	190,582	137	365,510
Michigan.....	1909	5,716	230,332	(²)	(²)
	1904	12,381	511,069	(²)	(²)
	1899	9,624	397,198	(²)	(²)
New York.....	1909	(²)	(²)	245	330,373
	1904	(²)	(²)	58	133,471
	1899	(²)	(²)	73	216,120
Ohio.....	1909	(²)	(²)	85	199,964
	1904	1,949	94,577	137	251,486
	1899	1,643	98,572	16	25,075
Pennsylvania.....	1909	(²)	(²)	82	192,901
	1904	5,715	242,059	87	175,555
	1899	6,240	275,438	80	150,990
Wisconsin.....	1909			38	85,228
	1904			22	45,214
	1899			8	15,475
All other states.....	1909	29,751	1,391,314	469	1,257,796
	1904	35,328	1,424,305	320	633,043
	1899	33,557	1,410,407	163	298,694

¹ A minus sign (-) denotes decrease. ² Included in "all other states."

In 1909, of the total number of reed and of pipe organs reported, 1.9 per cent were pipe organs, but of the combined value 51.1 per cent was contributed by pipe organs. In 1899, of the total number, only five-tenths of 1 per cent were pipe organs, while of the total value they contributed 22.6 per cent. In the number of reed organs there was a decrease during the decade 1899-1909 of 39.9 per cent and in their value a decrease of 35.8 per cent. For pipe organs there was an increase of 117 per cent in number and of 130.5 per cent in value.

In the manufacture of reed organs Illinois was the leading state in 1909 as in 1899, reporting 37.5 per cent and 41.3 per cent, respectively, of the total value. In the value of pipe organs manufactured Massachusetts, New York, and Illinois reported about equal amounts in 1909, Illinois showing much the largest gain from 1899 to 1909, while a decrease took place in Massachusetts.

DETAILED STATE TABLES.

The principal data secured by the census inquiry concerning the manufacture of pianos and organs and materials, other than those relating to the number and value of specific classes of instruments, are presented by states in Tables 20 and 21.

Table 20 shows, by states, for 1909, 1904, and 1899,

the number of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 21 gives more detailed statistics for the industry, by states, for 1909.

MUSICAL INSTRUMENTS, PIANOS AND ORGANS AND MATERIALS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1899	507	41,882	297	3,565	38,020	41,623	\$103,234	\$5,552	\$22,762	\$43,765	\$89,790	\$46,025
	1904	444	36,106	303	2,722	33,081	30,134	68,482	3,728	18,527	27,887	68,093	38,108
	1899	390	23,217	390	1,518	21,309	20,789	43,810	2,015	11,543	17,371	41,024	23,653
California.....	1909	11	78	9	12	57	53	189	14	60	41	150	109
	1904	12	133	9	19	105	174	351	19	86	69	208	139
	1899	8	44	7	2	35	10	73	2	26	20	76	56
Connecticut.....	1909	17	2,469	5	160	2,304	2,559	5,627	312	1,251	3,022	5,538	2,516
	1904	17	2,715	6	126	2,583	2,224	5,226	240	1,337	2,402	5,273	2,871
	1899	15	1,953	6	84	1,863	2,006	3,586	146	890	1,570	3,396	1,826
Illinois.....	1909	68	9,628	18	833	8,777	8,123	27,719	1,215	5,009	8,642	19,176	10,534
	1904	56	8,265	18	739	7,508	6,809	16,471	886	3,932	5,398	13,323	7,925
	1899	45	5,092	33	389	4,670	4,424	11,166	486	2,392	3,323	8,156	4,833
Indiana.....	1909	15	1,985	4	314	1,667	2,650	4,270	462	994	1,703	3,686	1,983
	1904	12	1,420	3	180	1,237	2,346	2,617	187	630	884	2,270	1,386
	1899	5	496	4	63	429	220	857	51	235	363	814	451
Kentucky.....	1909	6	370	4	23	343	796	655	32	222	272	588	316
	1904	6	381	6	15	360	478	424	19	188	244	505	261
	1899	4	50	4	3	43	140	118	1	22	71	112	41
Maryland.....	1909	7	833	8	68	757	613	2,301	82	464	566	1,466	900
	1904	8	725	13	67	645	689	1,742	127	356	244	1,389	1,145
	1899	9	574	10	41	523	553	1,253	47	263	404	942	538
Massachusetts.....	1909	59	4,681	33	403	4,245	4,454	11,632	600	2,698	4,149	9,106	4,957
	1904	55	4,500	37	292	4,171	3,381	8,306	429	2,488	3,114	8,279	5,165
	1899	61	3,433	57	201	3,175	2,787	7,007	318	1,903	2,302	6,172	3,870
Michigan.....	1909	17	1,963	8	176	1,779	2,690	5,384	299	1,075	2,009	4,226	2,217
	1904	13	1,167	14	84	1,069	1,310	2,364	113	537	750	1,984	1,234
	1899	11	827	4	63	760	812	1,212	69	378	474	1,180	706
Minnesota.....	1909	5	172	3	26	143	153	619	20	100	126	294	168
	1904	3	27	3	1	23	26	28	1	16	28	55	27
	1899	3	42	3	4	35	6	68	3	12	26	53	27
New Jersey.....	1909	18	1,500	6	101	1,393	1,121	2,020	129	721	1,076	2,229	1,153
	1904	14	1,181	6	65	1,110	1,400	1,522	77	560	657	1,477	820
	1899	15	850	16	71	763	745	1,407	44	360	563	1,332	769
New York.....	1909	184	13,102	117	1,047	11,938	10,905	33,019	1,870	7,752	17,495	33,680	16,185
	1904	160	10,573	133	826	9,614	6,569	21,023	1,256	5,925	10,950	23,390	12,440
	1899	135	7,393	153	439	6,801	6,207	13,107	641	3,963	6,563	14,746	8,183
Ohio.....	1909	30	1,987	16	130	1,841	2,254	3,593	172	1,092	1,922	3,926	2,004
	1904	26	2,336	10	116	2,210	2,153	3,357	150	1,205	1,625	3,684	2,059
	1899	18	844	20	53	771	1,008	1,349	61	358	710	1,451	741
Pennsylvania.....	1909	30	1,331	21	128	1,182	1,260	3,158	165	505	1,248	2,382	1,134
	1904	28	1,110	20	82	1,008	877	2,286	104	525	646	1,757	1,111
	1899	31	807	36	64	707	737	1,389	91	415	613	1,488	875
Vermont.....	1909	4	654	.....	44	610	1,966	1,077	65	327	402	1,268	866
	1904	3	433	.....	31	402	455	1,443	44	195	187	605	418
	1899	3	322	.....	16	306	.....	623	30	147	140	411	271
Wisconsin.....	1909	11	443	26	48	369	339	754	54	202	490	893	403
	1904	3	92	3	5	84	37	41	4	45	120	184	64
	1899	3	18	3	.....	15	14	25	.....	7	6	18	12
All other states.....	1909	25	686	19	52	615	1,687	1,217	61	320	602	1,182	580
	1904	28	1,048	22	74	952	1,206	1,281	72	502	669	1,710	1,041
	1899	24	472	34	25	413	1,150	510	25	172	223	677	454

¹ Excluding statistics for 2 establishments, to avoid disclosure of individual operations.

² Excluding statistics for 1 establishment, to avoid disclosure of individual operations.

³ Excluding statistics for 3 establishments, to avoid disclosure of individual operations.

THE MANUFACTURE OF MUSICAL INSTRUMENTS.

MUSICAL INSTRUMENTS, PIANOS AND ORGANS AND MATERIALS—DETAILED STATISTICS BY STATES: 1909.

Table 21

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.						Primary horse-power.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.	
								Maximum month.	Minimum month.						
United States...	507	41,832	297	1,061	1,788	666	38,020	De 40,011	Jy 36,269	40,373	37,527	2,098	571	177	41,623
California.....	11	78	9	8	2	2	57	Ja 74	Se 49	55	55				53
Connecticut.....	17	2,469	5	60	72	28	2,304	Oc 2,378	Jy 2,188	2,297	1,933	309	34	21	2,559
Illinois.....	68	9,628	18	199	455	179	8,777	Oc 9,293	Ja 8,341	9,187	8,361	503	264	59	8,123
Indiana.....	15	1,985	4	44	231	39	1,667	My 1,738	Jy 1,613	1,753	1,689	64			2,650
Iowa.....	4	68	3	4	5		56	Mh 66	My 47	58	54	4			51
Kentucky.....	6	370	4	10	9	4	343	De 395	Au 313	394	382	8	3	1	796
Maine.....	3	26	1	2	2	1	20	De 27	Ap 10	27	27				135
Maryland.....	7	833	8	12	43	13	757	De 792	Ja 721	792	741	12	39		613
Massachusetts.....	59	4,681	33	137	195	71	4,245	De 4,512	Jy 4,037	4,553	4,185	257	32	79	4,454
Michigan.....	17	1,963	8	54	97	25	1,779	De 1,956	Ja 1,641	1,957	1,892	55	10		2,690
Minnesota.....	5	172	3	9	9	8	143	De 167	Jy 131	167	166	1			153
New Jersey.....	18	1,500	6	28	33	40	1,393	Mh 1,436	Au 1,325	1,468	1,253	204	2	9	1,121
New York.....	184	13,102	117	359	472	216	11,938	De 12,705	Jy 11,131	12,878	12,181	556	133	8	10,905
Ohio.....	30	1,987	16	55	53	22	1,841	Oc 1,953	Jy 1,716	1,929	1,846	81	2		2,254
Pennsylvania.....	30	1,331	21	53	59	16	1,182	De 1,264	Jy 1,080	1,262	1,206	16	40		1,260
Vermont.....	4	654		9	23	12	610	Ja 635	Au 577	580	563	17			1,966
Wisconsin.....	11	443	26	21	15	12	369	Se 407	Mh 298	387	371	8	8		339
All other states ¹	18	592	15	17	13	8	539			629	622	3	4		1,501

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States...	\$103,234,301	\$80,750,525	\$3,047,625	\$2,504,561	\$22,761,568	\$737,500	\$43,027,237	\$907,360	\$423,964	\$292,907	\$7,047,803	\$89,789,644	\$46,024,807
California.....	189,183	135,999	12,301	1,485	60,403	2,194	38,776	4,976	845		15,019	150,308	109,338
Connecticut.....	5,626,585	4,984,149	201,612	110,483	1,251,393	56,768	2,964,983	16,546	22,189	7,731	352,444	5,538,018	2,516,267
Illinois.....	27,718,851	16,686,065	631,455	583,811	5,009,042	158,028	8,484,403	89,168	95,084	14,144	1,620,930	19,176,328	10,533,897
Indiana.....	4,269,762	3,522,884	121,606	340,265	993,609	44,158	1,658,881	5,391	12,170	300	346,504	3,685,962	1,982,923
Iowa.....	126,166	111,394	7,145	5,700	34,260	2,304	49,480	2,705	32	597	9,171	93,225	41,441
Kentucky.....	654,553	550,968	21,224	10,839	221,993	5,543	266,192	240	3,385		21,552	588,352	316,617
Maine.....	85,496	37,800	1,872	1,728	10,283	381	18,368	228	199		4,741	43,274	24,525
Maryland.....	2,301,096	1,260,845	37,875	43,799	463,631	10,304	556,110	1,980	16,214	38	130,894	1,466,344	899,930
Massachusetts.....	11,632,136	8,309,051	337,738	262,015	2,667,970	93,371	4,055,885	141,758	68,481	3,557	678,276	9,106,470	4,957,214
Michigan.....	5,384,400	3,821,211	143,279	156,089	1,075,304	38,609	1,970,866	8,530	22,419		406,115	4,226,266	2,216,791
Minnesota.....	618,547	288,427	13,514	6,978	99,546	6,380	120,059	495	1,226		40,229	294,452	168,013
New Jersey.....	2,019,925	2,141,486	65,962	62,605	720,594	24,766	1,051,307	26,700	7,647	24,994	156,911	2,229,145	1,153,072
New York.....	83,019,385	30,567,168	1,150,241	719,776	7,752,487	212,493	17,282,254	523,982	138,210	216,916	2,570,809	33,679,953	16,185,206
Ohio.....	3,593,177	3,549,176	111,593	60,562	1,092,113	30,944	1,891,439	53,806	19,209	1,985	287,525	3,925,757	2,003,374
Pennsylvania.....	3,157,965	2,117,165	104,161	61,249	505,343	21,104	1,227,241	17,827	3,293	1,151	175,796	2,381,849	1,133,504
Vermont.....	1,076,652	937,887	21,450	43,217	326,641	13,452	388,485	1,760	3,147	21,000	118,735	1,267,566	865,629
Wisconsin.....	753,643	820,820	34,647	19,594	202,223	9,373	480,788	8,100	4,228	394	61,473	892,957	492,796
All other states ¹	1,006,779	908,030	29,950	14,366	274,733	7,328	521,720	3,168	5,986	100	50,679	1,043,318	514,270

¹ All other states embrace: Colorado, 1 establishment; Delaware, 1; Kansas, 1; Missouri, 5; New Hampshire, 4; North Carolina, 1; Rhode Island, 1; Tennessee, 1; Virginia, 1; Washington, 2.

**THE MANUFACTURE OF MUSICAL INSTRUMENTS AND MATERIALS, OTHER THAN PIANOS AND
ORGANS.**

The establishments assigned to this branch of the musical instrument industry are those engaged chiefly in the manufacture of various kinds of musical instruments other than pianos and organs, or of materials for such instruments. The instruments made include cornets, trombones, tubas, and other brass instruments for band and orchestral use, cymbals, drums, xylophones, castanets, dulcimers, harps, lyres, guitars, lutes, banjos, mandolins, zithers, violins, violoncellos,

flutes, flageolets, piccolos, etc., and parts of such instruments. Separate totals as to the number and value of any of the several classes of instruments were not secured. The industry is shown in Volumes VIII and IX of the Thirteenth Census Reports under the designation "Musical instruments and materials, not specified."

Table 22 summarizes the statistics for the industry as reported at each census from 1869 to 1909, inclusive.

	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
	Number of establishments.....	187	181	229	293	84	83	-18.3	3.3	-21.0	-21.8	248.8	1.2
Persons engaged in the industry.....	2,269	2,554	2,799	(*)	(*)	(*)	-18.9	-11.2	-8.8			
Proprietors and firm members.....	187	190	236	(*)	(*)	(*)	-20.8	-1.6	-19.5			
Salaried employees.....	260	225	158	(*)	(*)	(*)	64.6	15.6	42.4			
Wage earners (average number).....	1,822	2,139	2,405	1,056	573	1,059	-24.2	-14.8	-11.1	127.7	(*)	(*)
Primary horsepower.....	1,423	1,603	1,417	696	(*)	562	0.4	-11.2	13.1	103.6		
Capital.....	\$3,297,669	\$3,743,469	\$3,896,101	\$1,329,329	\$654,850	\$1,351,600	-15.4	-11.9	-3.9	193.1	103.0	-51.6
Expenses.....	2,647,477	2,970,596	2,850,214	1,551,329	(*)	(*)	-7.1	-10.9	4.2	83.7		
Services.....	1,335,128	1,413,834	1,373,784	862,177	293,062	631,634	-2.8	-5.6	2.9	69.3	194.2	-53.6
Salaries.....	342,853	251,766	141,745	(*)	(*)	(*)	141.9	36.2	77.6			
Wages.....	992,275	1,162,068	1,232,039	(*)	(*)	(*)	-19.5	-14.6	-5.7			
Materials.....	889,600	1,129,939	1,205,337	610,664	385,776	932,657	-26.2	-21.3	-6.3	136.0	32.4	-58.6
Miscellaneous.....	422,749	426,823	271,093	178,488	(*)	(*)	55.9	1.0	57.4	51.9		
Value of products.....	3,228,108	3,481,710	3,394,734	1,888,613	853,746	2,019,464	-4.9	-7.3	2.6	79.7	121.2	-57.7
Value added by manufacture (value of products less cost of materials).....	2,338,508	2,351,771	2,189,397	1,377,949	467,970	1,086,807	6.8	-0.6	7.4	58.9	194.4	-56.9

¹ A minus sign (-) denotes decrease. Where percentages are omitted comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The value of products for this branch of the musical instrument industry does not show a very general increase from census to census. The value in 1879 was 57.7 per cent less, and that in 1889 was 6.5 per cent less, than the value of products in 1869. The value in 1909 was 7.3 per cent less than that in 1904, and 4.9 per cent less than that in 1899. During the first half of the decade ending with 1909 there was considerable decrease in the number of establishments, accompanied by smaller decreases in the number of persons employed, capital invested, wages paid, and cost of materials, and an increase in the salaries, miscellaneous expenses, value of products, and value added by

manufacture. During the last half of the decade there was a decrease in all of the items except the number of establishments, number of salaried employees, and salaries.

Table 23 gives more detailed statistics for the industry in the United States and for the different states as reported for 1909. New Jersey, Illinois, and Indiana, in the order named, were the leading states in the industry as measured by value of products, each of these states reporting about one-fifth of the total value of products for the United States, and the three together reporting 58.1 per cent of the total. New York ranked fourth in value of products for the industry.

MUSICAL INSTRUMENTS AND MATERIALS, NOT SPECIFIED—DETAILED STATISTICS, BY STATES: 1909.

Table 23

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			16 and over.		Under 16.			
					Male.	Female.	Average number.	Number, 15th day of—		Male.	Female.	Male.	Female.		
								Maximum month.	Minimum month.						
United States.....	187	2,269	187	89	87	84	1,822	De 1,957	Ja 1,749	1,963	1,728	212	21	4	1,423
California.....	5	14	6				8	Ja ¹ 8	Jy ¹ 8	9	9				4
Connecticut.....	3	5	3				2	Ja ¹ 2	Jy ¹ 2	2	2				208
Illinois.....	30	425	35	19	20	15	336	No 383	Jy 290	370	351	11	8		216
Indiana.....	9	429	6	11	10	12	390	My 402	Ja 369	398	344	51	3		
Iowa.....	4	4	4					(²)	(²)						213
Massachusetts.....	18	193	17	7	5	10	154	Ne ³ 170	Ja 136	170	140	27	3		161
Michigan.....	9	211	9	18	12	13	159	Ap ³ 163	Au 154	158	150	8			10
Minnesota.....	3	5	3				2	Ja ¹ 2	Jy ¹ 2	2	2				2
Missouri.....	4	14	3	3			8	My ³ 8	Ja ³ 7	8	8				335
New Jersey.....	7	435	5	13	18	14	385	De 442	Fe 350	442	341	92	5	4	176
New York.....	52	360	51	11	15	11	272	De 296	Je 280	297	274	23			49
Ohio.....	8	63	8	1	3	4	47	My ³ 50	Ja ³ 44	46	46				43
Pennsylvania.....	19	87	18	6	4	5	54	Oc 61	Ja 34	57	55		2		1
Washington.....	5	6	6				2	Ja ¹ (²) 2	Jy ¹ (²) 2	2	2				5
Wisconsin.....	4	7	5				2			2	2				
All other states ⁴	7	11	8				3			2	2				

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States.....	\$3,297,669	\$2,647,477	\$251,702	\$91,151	\$992,275	\$38,447	\$851,153	\$73,815	\$12,494	\$14,980	\$321,450	\$3,228,108	\$2,338,508
California.....	10,220	10,897			6,534	36	2,965	812	109		441	16,108	13,107
Connecticut.....	5,100	4,976			1,092	122	3,194	96	31		441	10,850	7,534
Illinois.....	511,662	502,478	36,041	21,208	200,606	8,797	169,675	18,500	2,192	72	45,389	623,163	450,691
Indiana.....	603,640	562,454	110,394	12,756	208,479	7,684	100,046	1,725	2,481		118,889	610,081	502,351
Iowa.....	3,925	1,211			35	590	361	11			214	6,234	5,609
Massachusetts.....	168,359	214,205	10,265	7,002	80,872	2,810	81,956	10,182	592	3,702	16,824	259,781	175,015
Michigan.....	179,151	193,123	22,566	12,768	83,960	3,212	37,246	1,781	1,310		30,280	223,071	182,613
Minnesota.....	2,294	2,760			1,577	117	517	396	23		130	4,405	3,771
Missouri.....	26,860	19,142	4,311		4,885	219	7,901	980	49		797	24,973	16,853
New Jersey.....	1,032,920	500,888	40,962	13,005	180,502	5,114	202,957	456	3,607	78	54,207	635,209	427,138
New York.....	450,712	463,489	17,422	16,396	153,632	7,052	204,115	28,672	1,182	6,789	28,229	569,985	358,818
Ohio.....	74,145	59,608	1,125	4,329	32,604	1,023	7,071	1,054	395	1,559	10,448	80,884	72,790
Pennsylvania.....	201,057	92,861	8,616	3,689	32,464	1,922	24,086	5,742	394	2,790	13,158	115,118	89,110
Washington.....	6,404	2,532				42	1,408	842	14		268	9,995	8,587
Wisconsin.....	6,130	4,982			1,980		2,469	360	8		123	11,241	8,730
All other states ⁴	15,070	11,871			3,088	262	4,957	1,856	96		1,612	21,010	15,791

¹ Same number reported throughout the year. ² None reported throughout the year. ³ Same number reported for one or more other months. ⁴ All other states embrace: Colorado, 1 establishment; Georgia, 1; Kentucky, 2; Maine, 1; Maryland, 1; Utah, 1.

THE PHONOGRAPH AND GRAPHOPHONE INDUSTRY.

The establishments assigned to this industry were engaged chiefly in the manufacture of phonographs or graphophones for either disk or cylinder records, including those for office dictation. The classification also includes the manufacture of records, blanks, horns, needles, or other supplies and materials used in the industry.

Table 24 summarizes the statistics for the manufacture of phonographs and graphophones as reported at the censuses of 1909, 1904, and 1899.

	PHONOGRAPHS AND GRAPHOPHONES.				
	Number or amount.			Per cent of increase. ¹	
	1909	1904	1899	1904-1909	1899-1904
Number of establishments.....	18	14	11	28.6	27.3
Persons engaged in the industry.....	5,928	3,940	1,415	50.5	178.4
Proprietors and firm members.....	2	6	4	-66.7	50.0
Salaried employees.....	727	537	144	35.4	272.9
Wage earners (average number).....	5,199	3,397	1,267	53.0	168.1
Primary horsepower.....	6,371	2,522	1,082	152.6	133.1
Capital.....	\$14,363,361	\$8,740,618	\$3,348,282	64.3	161.0
Expenses.....	9,388,735	8,165,290	1,830,565	15.0	346.1
Services.....	3,785,766	2,350,392	787,635	61.1	198.4
Salaries.....	945,263	666,489	179,145	41.8	272.0
Wages.....	2,840,503	1,683,903	608,490	68.7	176.7
Materials.....	3,099,391	4,161,136	827,529	-25.5	402.8
Miscellaneous.....	2,503,578	1,653,762	215,401	51.4	667.8
Value of products.....	11,725,996	10,237,075	2,246,274	14.5	355.7
Value added by manufacture (value of products less cost of materials).....	8,626,605	6,075,939	1,418,745	42.0	328.3

¹ A minus sign (-) denotes decrease.

No statistics are given for the industry in census reports prior to 1889; at that census there were only two establishments reported, and therefore the data were not shown separately. Each census since 1899 has shown an increase in the manufacture of phonographs and graphophones, but by far the greater development occurred during the five-year period 1899-1904, when there was an increase of 2,525, or 178.4 per cent, in the number of persons engaged in the industry, and of \$7,990,801, or 355.7 per cent, in the value of products. While there was an increase of only 7 in the number of establishments during the decade, the number of persons engaged in the industry in 1909 was more than four times and the value of products more than five times as great as the corresponding figures for 1899. In 1909, 16 of the 18 establishments were operated by corporations.

Table 25 gives in greater detail the statistics for the industry as reported for 1909. Pennsylvania is the only state for which the statistics could be given separately without disclosing the operations of individual establishments, and as Pennsylvania is not one

of the leading states in the industry, it has not been deemed worth while to present data in detail for this state. The value of the products of the three establishments in Pennsylvania in 1909 was \$134,659, or only 1.1 per cent of the total for the country. New Jersey is by far the leading state in the industry, as measured by value of products, followed by Connecticut and New York in the order named.

Table 25

	United States.
Number of establishments.....	18
Persons engaged in the industry.....	5,928
Proprietors and firm members.....	2
Salaried officers, superintendents, and managers.....	106
Clerks.....	621
Male.....	404
Female.....	217
Wage earners (average number).....	5,199
Number, 15th day of month:	
Maximum—	
Month.....	January.
Number.....	6,524
Minimum—	
Month.....	September.
Number.....	4,409
Wage earners—Dec. 15, or nearest representative day.....	5,996
16 and over.....	5,931
Male.....	5,249
Female.....	682
Under 16.....	65
Male.....	31
Female.....	34
Primary horsepower.....	6,371
Capital.....	\$14,363,361
Expenses.....	9,388,735
Services.....	3,785,766
Officials.....	477,041
Clerks.....	468,222
Wage earners.....	2,840,503
Materials.....	3,099,391
Fuel and rent of power.....	118,693
Other.....	2,980,698
Miscellaneous.....	2,503,578
Rent of factory.....	18,112
Taxes, including internal revenue.....	32,475
Contract work.....	259
Other.....	2,452,732
Value of products.....	11,725,996
Value added by manufacture (value of products less cost of materials).....	8,626,605

Of the total number of persons engaged in the industry, 5,199, or 87.7 per cent, were wage earners; 621, or 10.5 per cent, clerks, a class which includes other subordinate salaried employees; and 108, or 1.8 per cent, proprietors and officials. Of the number of wage earners reported on December 15, or the nearest representative day, 88.1 per cent were males and 11.9 per cent females. The number of wage earners under 16 years of age represented but 1.1 per cent of the total. January was the month of maximum and September that of minimum employment, the number shown for the latter month being equal to 67.6 per cent of the number for the former month.

The total expenses reported for the phonograph and graphophone industry amounted to \$9,388,735, of which 33 per cent represented the cost of materials, 30.3 per cent wages, 10.1 per cent salaries, and 26.7 per cent miscellaneous expenses.

Table 26 shows the number of establishments that manufactured each kind of product for which separate statistics were reported at the census of 1909.

CLASS OF PRODUCT.	Number of establishments.
Total	18
Phonographs or graphophones only.....	1
Phonographs or graphophones and records and blanks.....	1
Phonographs or graphophones and other products.....	3
Phonographs or graphophones, records and blanks, and other products.....	3
Records and blanks only.....	3
Disk records only.....	1
Cylinder records only.....	1
Cylinder records and blanks.....	1
Other products (including parts and supplies).....	7

Of the 18 establishments in the industry, 8 reported the manufacture of phonographs or graphophones, some of which also made other products of the industry; 3 made records and blanks only; and 7 reported the manufacture of parts, supplies, etc.

Table 27 shows for 1909 the number and value of such of the products as it is practicable to present without disclosing the operations of individual concerns.

PRODUCT.	PHONOGRAPHS AND GRAPHOPHONES: 1909	
	Number.	Value.
Total		\$11,725,996
Phonographs and graphophones.....	344,681	5,406,684
For disk records.....	191,990	3,224,720
For cylinder records and office dictation.....	153,691	2,181,964
Records and blanks.....	27,183,959	5,007,104
Disk records.....	8,572,805	2,567,717
Cylinder records and blanks.....	18,611,154	2,439,387
All other products.....		1,312,208

In addition to the products shown in Table 27, which were valued at \$11,725,996, similar products to

the value of \$31,889 were manufactured in establishments engaged primarily in other industries. On the other hand, a few of the 18 establishments in the industry "phonographs and graphophones" also manufactured other products, such as fire extinguishers and electrical supplies.

Of the total value of products reported for the industry in 1909, \$11,725,996, the value of complete instruments formed \$5,406,684, or 46.1 per cent, and that of records and blanks \$5,007,104, or 42.7 per cent. The remainder, \$1,312,208, or 11.2 per cent, represented for the most part horns, needles, matrices, and other supplies used in the manufacture or operation of the instruments.

The records and blanks, parts, and supplies are frequently sold to establishments that manufacture the complete instruments. In such cases the value of the parts and supplies are duplicated in the total value of products.

At the censuses of 1904 and 1899 separate totals were shown only for the value of the completed instruments, records and blanks, and of all other products. In Table 28 these values are placed in comparison with the totals for the same items reported in 1909.

	VALUE.			
	1909	1904	1899	Per cent of increase: 1899-1909
Total	\$11,725,996	\$10,237,075	\$2,246,274	422.0
Phonographs and graphophones.....	5,406,684	2,966,343	1,240,503	335.8
Records and blanks.....	5,007,104	4,678,547	539,370	828.3
All other products.....	1,312,208	2,592,185	466,401	181.3

CHEMICALS

(527)

THE MANUFACTURE OF CHEMICALS AND ALLIED INDUSTRIES.

INTRODUCTION.

The first special report on the manufacture of chemicals and allied products issued by the Bureau of the Census was that presented in connection with the reports of the census of manufactures for 1879. This report, like those for succeeding censuses, covered the operations of establishments engaged in the manufacture of acids, sodas, potashes, alums, glycerin, dyestuffs and tanning materials, explosives, fertilizers, pigments, wood distillation products, salts, and certain elementary substances, such as bromine and phosphorus, and in addition, embraced the statistics for establishments engaged primarily in the manufacture of soap, candles, castor oil, glucose, and sulphur, which have not been included in the reports for subsequent censuses. At the census of 1889, the manufacture of pharmaceutical preparations and of paint and varnish were added to the group of industries covered by the special report, and at the census of 1899, the manufacture of essential oils and of bone, ivory, and lamp black were added, while the manufacture of pharmaceutical preparations was dropped from the group.

Tables 1 and 2 of the present report cover practically the same ground as those for 1904 and 1899, containing statistics for nine separate industries, according to the classification employed by the Bureau of the Census, taken together, and for each individual industry separately, as follows:

- The general chemical industry.
- The manufacture of sulphuric, nitric, and mixed acids.
- Wood distillation.
- The paint and varnish industry.
- The fertilizer industry.
- The manufacture of explosives.
- The manufacture of dyestuffs and extracts.
- The manufacture of essential oils.
- The manufacture of bone, carbon, and lamp black.

Separate reports containing detailed statistics are presented for each of the nine industries.

SUMMARY FOR THE NINE INDUSTRIES.

Comparison with earlier censuses for the group as a whole.—Table 1 summarizes the statistics of the nine industries covered by this report for the censuses of 1909, 1904, and 1899.

The number of establishments in the nine industries

combined increased from 1,691 in 1899 to 2,140 in 1909, or 26.6 per cent, and the number of wage earners employed from 46,700 to 70,426, or 50.8 per cent. The value of products for the combined industries necessarily involves a considerable amount of duplication, because of the use of the products of establishments in some industries as material for establishments in others. The amount of this duplication may vary materially at different censuses, and for this reason the increase in the value added by manufacture (value of products less cost of materials) is a better measure of the growth of the industries than that in the value of products. The value added by manufacture was \$166,968,565 in 1909, as compared with \$78,488,032 in 1899, an increase of \$88,480,533, or 112.7 per cent for the decade. Although the absolute increase in value of products during the 10 years (\$222,578,464) was much greater than that in value added by manufacture, the relative increase, 109.9 per cent, was slightly less.

Table 1

	CHEMICALS AND ALLIED INDUSTRIES.					
	Number or amount.			Per cent of increase.		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments.....	2,140	1,785	1,691	26.6	19.9	5.6
Persons engaged in the industries.....	88,097	71,448	(¹)	.....	23.3	.....
Proprietors and firm members.....	1,155	1,125	(¹)	.....	2.7	.....
Salaried employees..	16,516	11,142	8,602	92.0	48.2	29.5
Wage earners (average number).....	70,426	59,181	46,700	50.8	19.0	26.7
Primary horsepower.....	398,880	280,765	191,489	108.3	42.1	46.6
Capital.....	\$483,729,410	\$323,891,131	\$238,471,290	102.8	49.3	35.8
Expenses.....	359,425,126	247,107,481	171,963,827	109.0	45.5	43.7
Services.....	62,700,767	44,508,161	33,122,930	89.3	40.9	34.4
Salaries.....	24,042,566	15,007,298	11,339,595	112.0	60.2	32.3
Wages.....	38,658,201	29,500,863	21,783,335	77.5	31.0	35.4
Materials.....	258,115,975	176,344,680	124,018,044	108.1	46.4	42.2
Miscellaneous.....	38,608,334	26,254,640	14,822,853	160.5	47.1	77.1
Value of products.....	425,084,540	282,077,616	202,506,076	109.9	50.7	39.3
Value added by manufacture (value of products less cost of materials).....	166,968,565	105,732,936	78,488,032	112.7	57.9	34.7

¹ Figures not available.

Summary, by industries.—Table 2 presents for 1909 a summary of the statistics of the several industries constituting the group as a whole.

Table 2

CHEMICALS AND ALLIED INDUSTRIES: 1909

	Total.	Chemicals.	Sulphuric, nitric, and mixed acids.	Wood distillation, not including turpentine and rosin.	Paint and varnish.	Fertilizers.	Explosives.	Dyestuffs and extracts.	Essential oils.	Bone, carbon, and lamp black.
Number of establishments.....	2,140	349	42	120	791	550	86	107	68	27
Persons engaged in the industries..	88,097	27,791	2,582	3,095	21,896	21,950	7,058	3,015	408	302
Proprietors and firm members.....	1,155	154	.....	56	456	323	21	65	73	7
Salaried employees.....	16,516	3,923	330	318	7,200	3,317	763	553	45	67
Wage earners (average number).....	70,426	23,714	2,252	2,721	14,240	18,310	6,274	2,397	290	228
Primary horsepower.....	398,880	208,604	6,494	9,854	56,162	64,711	28,601	22,213	1,218	1,023
Capital.....	\$483,729,410	\$155,143,739	\$18,726,195	\$13,017,192	\$103,994,908	\$121,537,451	\$50,167,976	\$17,934,545	\$1,365,438	\$1,841,966
Expenses.....	359,425,126	93,931,193	8,347,722	8,473,558	111,202,408	90,101,293	31,460,284	13,492,987	1,522,171	833,510
Services.....	62,700,767	20,221,089	2,045,894	1,818,059	18,649,074	11,882,815	5,437,976	2,233,705	184,495	227,660
Salaries.....	24,042,566	6,136,588	551,000	355,211	10,378,361	4,405,636	1,133,606	942,326	61,505	78,333
Wages.....	38,658,201	14,084,501	1,494,894	1,462,848	8,270,713	7,477,179	4,304,370	1,291,379	122,990	149,327
Materials.....	253,115,975	64,121,536	5,385,828	5,875,851	79,015,555	69,521,920	22,811,548	9,683,651	1,255,478	444,608
Miscellaneous.....	38,608,384	9,648,568	916,000	779,648	13,537,779	8,696,558	3,210,760	1,575,631	82,198	161,242
Value of products.....	425,084,540	117,688,887	9,884,057	9,736,998	124,889,422	103,960,213	40,139,661	15,954,674	1,737,234	1,093,494
Value added by manufacture (value of products less cost of materials).....	166,968,565	53,567,351	4,498,229	3,861,147	45,873,867	34,438,293	17,328,113	6,270,923	481,756	648,886

"Chemicals" was the leading branch in number of wage earners, reporting 33.7 per cent of the total for the combined chemical industry, followed by "fertilizers" and "paint and varnish," with 26 per cent and 20.2 per cent, respectively. Paint and varnish led in value of products with 29.4 per cent of the total for the industry as a whole, followed by chemicals and fertilizers with 27.7 per cent and 24.5 per cent, re-

spectively. In value added by manufacture, "chemicals" is first with 32.1 per cent of the total, followed by "paint and varnish" and "fertilizers," with 27.5 per cent and 20.6 per cent, respectively. These three branches together reported 79.9 per cent of the average number of wage earners in the combined industry, 81.5 per cent of the value of products, and 80.2 per cent of the value added by manufacture.

THE GENERAL CHEMICAL INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—The classification “chemicals,” as employed in the census statistics of manufactures, covers establishments engaged in the manufacture of a great variety of products, which may be grouped under the following heads:

- I. Acids, except sulphuric, nitric, and mixed acids and such as are made by establishments in the wood distillation industry.
- II. Sodas.
- III. Potashes.
- IV. Alums.
- V. Coal-tar products.
- VI. Cyanides.
- VII. Bleaching materials.
- VIII. Electrochemicals (substances produced by the aid of electricity, including metals and alloys produced by electrolytic or electrometallurgic processes).
- IX. Plastics.
- X. Compressed or liquefied gases.
- XI. Fine chemicals.
- XII. Chemicals not otherwise specified.

The classification, however, does not cover the production of all substances coming under the head of chemicals in the ordinary acceptance of the term, as in many instances the manufacture of such products is included under some more distinctive industry classification. Thus establishments engaged in the manufacture of sulphuric, nitric, or mixed acids as a primary product are included under the separate classification “sulphuric, nitric, and mixed acids”; the production of alcohol by wood distillation is included under the classification “wood distillation, not including turpentine and rosin”; and the production of chemical substances for use as fertilizers is included under the classification “fertilizers.” The manufacture of dyestuffs and extracts, explosives, essential oils, and paint and varnish may also properly be classed as chemical. The statistics for the chemical industry, as defined by the Census Bureau, thus fall considerably short of constituting a complete presentation of the business of manufacturing chemical substances for sale, although it is probable that the classification covers the production of the great majority of the substances which are included under the term “chemicals” as popularly understood.

The scope of the classification was the same in 1909 as in 1904; in 1899 and at prior censuses, however, the classification included the manufacture of sulphuric, nitric, and mixed acids and wood distillation, which were classified as independent industries at the censuses of 1909 and 1904.

Comparison with earlier censuses.—Table 1 summarizes the statistics of the chemical industry for each census from 1899 to 1909, inclusive.

The statistics shown for 1899 in the table do not include those for the manufacture of sulphuric, nitric, and mixed acids and the wood distillation industry, which were included under the general classifica-

tion “chemicals” at that census and the figures for which are included with those for the chemical industry in some of the other tables of this report. The value of products shown in the table conveys no precise idea of the magnitude or extent of the industry, since it involves considerable duplication due to the use of the products of some establishments in the industry as materials in other establishments, and also because it does not include the products of the kind embraced in the enumeration which are produced in establishments engaged primarily in manufacturing other products. The number of establishments increased 17.5 per cent during the decade from 1899 to 1909; the average number of wage earners employed, 57 per cent; the value of products, 145 per cent; and the value added by manufacture, 155.3 per cent.

Table 1

	CHEMICAL INDUSTRY.					
	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899 ²	1899-1909	1904-1909	1899-1904
Number of establishments..	349	275	297	17.5	26.9	—7.4
Persons engaged in the industry.....	27,791	22,707	(³)	.....	22.4	.....
Proprietors and firm members.....	154	123	(³)	.....	25.2	.....
Salaried employees.....	3,923	2,778	1,590	146.7	41.2	74.7
Wage earners (average number).....	23,714	19,806	15,108	57.0	19.7	31.1
Primary horsepower.....	208,604	132,262	(³)	.....	57.7	.....
Capital.....	\$155,143,739	\$96,621,294	\$68,358,817	127.0	60.6	41.3
Expenses.....	93,991,193	64,493,132	40,323,799	133.1	45.7	59.9
Services.....	20,221,089	14,837,669	9,686,865	108.7	36.3	53.2
Salaries.....	6,136,588	4,047,889	2,321,662	164.3	51.6	74.4
Wages.....	14,084,501	10,789,780	7,365,203	91.2	30.5	46.5
Materials.....	64,121,536	42,062,611	27,057,609	137.0	52.4	55.5
Miscellaneous.....	9,648,568	7,592,852	3,579,325	169.6	27.1	112.1
Value of products.....	117,688,887	75,222,249	48,039,995	145.0	56.6	56.6
Value added by manufacture (value of products less cost of materials).....	53,567,351	33,159,638	20,981,986	155.3	61.5	58.0

¹ A minus sign (—) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Excluding statistics for the manufacture of sulphuric, nitric, and mixed acids and wood distillation, which were included under the classification “chemicals” in 1899.

³ Comparable figures not available.

Table 2 gives statistics for the chemical industry, the manufacture of sulphuric, nitric, and mixed acids, and wood distillation combined (the chemical industry as constituted at censuses prior to 1904), for each census from 1849 to 1909, inclusive.

Table 2

CENSUS.	CHEMICALS, SULPHURIC, NITRIC, AND MIXED ACIDS, AND WOOD DISTILLATION INDUSTRIES.					
	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	511	28,687	\$17,042,243	\$75,383,215	\$137,309,942	\$61,926,727
1904.....	448	24,525	13,361,972	51,883,219	92,088,378	40,205,159
1899.....	433	19,020	9,393,236	34,545,862	62,637,008	28,091,146
1889.....	563	15,038	7,308,411	33,694,927	59,352,548	25,657,621
1879.....	595	9,724	4,222,663	24,665,766	38,640,458	13,974,692
1869.....	408	5,119	2,252,856	12,010,576	20,091,575	8,080,999
1859.....	299	2,014	637,156	3,086,681	5,419,791	2,333,110
1849.....	170	1,389	422,560	3,235,380	4,979,630	1,744,250

Summary, by states.—Table 3 summarizes the more important statistics of the industry, by states, the states being arranged according to the value of prod-

ucts reported for 1909. Some states for which data can not be shown separately ranked higher than some named in the table.

STATE.	Number of establishments: 1909	Wage earners.			Value of products.				Value added by manufacture.				Percent of increase: 1904-1909 ¹			
		Average number: 1909	Per cent distribution: 1909	Rank.		Amount: 1909	Per cent distribution: 1909	Rank.		Amount: 1909	Per cent distribution: 1909	Rank.		Wage earners (average number).	Value of products.	Value added by manufacture.
				1909	1904			1909	1904			1909	1904			
United States.....	349	23,714	100.0	.....	.....	\$117,688,887	100.0	.....	.....	\$53,587,351	100.0	.....	.....	19.7	56.5	61.5
New York.....	74	5,746	24.2	1	1	35,346,072	30.0	1	1	15,637,518	29.2	1	1	15.7	53.5	55.4
New Jersey.....	50	5,046	21.3	2	2	22,824,140	19.4	2	2	10,566,662	19.7	2	2	40.3	75.2	65.3
Pennsylvania.....	37	3,185	13.4	3	3	15,978,162	13.6	3	3	5,778,241	10.8	4	4	-5.6	35.7	28.1
Michigan.....	36	3,174	13.4	4	4	12,890,206	11.0	4	4	7,817,825	14.8	3	3	-4.8	42.6	68.7
Ohio.....	33	1,132	4.8	6	5	7,742,045	6.6	5	5	2,993,749	5.6	5	6	10.4	68.7	88.7
Massachusetts.....	24	1,358	5.7	5	6	5,916,451	5.0	6	6	2,868,199	5.4	6	5	57.9	68.6	43.8
Illinois.....	19	836	3.5	8	7	4,656,274	4.0	7	8	1,760,474	3.3	7	8	16.0	103.9	89.7
Missouri.....	9	619	2.6	9	8	3,640,116	3.1	8	7	1,416,152	2.6	8	7	-3.3	11.0	27.9
Maryland.....	3	285	1.2	11	9	1,313,103	1.1	11	10	629,115	1.2	11	9	-11.8	21.3	27.6
California.....	13	244	1.0	12	11	1,306,373	1.1	12	9	544,788	1.0	12	10	-5.8	16.2	28.3
Wisconsin.....	5	76	0.3	15	15	513,099	0.4	13	14	270,962	0.5	14	12	.....	93.6	111.7
Louisiana.....	4	36	0.2	19	19	248,815	0.2	17	22	76,877	0.1	19	21	.....	.....	.....
Georgia.....	4	53	0.2	17	16	245,725	0.2	18	15	185,750	0.3	16	13	.....	85.0	.....
Kentucky.....	5	39	0.2	18	.....	94,710	0.1	22	.....	54,205	0.1	22	.....	.....	.....	.....
All other states.....	33	1,885	7.9	.....	.....	4,973,596	4.2	.....	.....	2,966,834	5.5	.....	.....	.....	.....	.....

¹ Percentages of increase are based on figures in Table 51. A minus sign (-) denotes decrease. Percentages not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.

New York reported 30 per cent of the total value of products for the industry in 1909, New Jersey 19.4 per cent, Pennsylvania 13.6 per cent, and Michigan 11 per cent. These four states together contributed nearly three-fourths (74 per cent) of the total value of products and gave employment to 72.3 per cent of the average number of wage earners. Of the states which reported products valued at \$1,000,000 or over in 1909, Illinois shows the highest rate of increase in value of products from 1904 to 1909, 103.9 per cent, followed by New Jersey, Ohio, and Massachusetts in the order named.

PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 4 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE CHEMICAL INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	27,791	26,215	1,578
Proprietors and officials.....	1,086	1,072	14
Proprietors and firm members.....	154	146	8
Salaried officers of corporations.....	367	361	6
Superintendents and managers.....	565	555	.....
Clerks.....	2,991	2,492	499
Wage earners (average number).....	23,714	22,651	1,063
16 years of age and over.....	23,548	22,555	993
Under 16 years of age.....	166	96	70

The average number of persons engaged in the industry during 1909 was 27,791, of whom 23,714, or 85.3 per cent, were wage earners, 1,086, or 3.9 per cent, proprietors and officials, and 2,991, or 10.8 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 26,215, or 94.3 per cent, were males, and 1,576, or 5.7 per cent, females.

The average number of wage earners in each state for 1909, 1904, and 1899 is given in Table 51. The average number distributed by sex and age is not shown for the individual states, but Table 52 gives such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 5.

CLASS.	PERSONS ENGAGED IN THE CHEMICAL INDUSTRY.				Per cent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	27,791	100.0	22,707	100.0	22.4
Proprietors and firm members.....	154	0.6	123	0.5	25.2
Salaried employees.....	3,923	14.1	2,778	12.2	41.2
Wage earners (average number).....	23,714	85.3	19,806	87.2	19.7

Table 6 shows the average number of wage earners in the industry, distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909 and 1904. Comparable figures for 1899 are not available.

Table 6

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE CHEMICAL INDUSTRY.			
	1909		1904	
	Number.	Per cent distribution.	Number.	Per cent distribution.
Total	23,714	100.0	19,806	100.0
16 years of age and over.....	23,548	99.3	19,732	99.6
Male.....	22,555	95.1	18,651	94.2
Female.....	993	4.2	1,081	5.4
Under 16 years of age.....	166	0.7	74	0.4

Wage earners employed, by months.—Table 7 gives the number of wage earners employed in the industry

on the 15th (or the nearest representative day) of each month during the year 1909 for eight of the states in which an average of 500 or more wage earners were employed during the year.

There was comparatively little variation from month to month in the number of wage earners employed. The largest number reported for any month of 1909 was 25,073, in December, and the smallest, 22,609, in January, the minimum number being equal to 90.2 per cent of the maximum. In 1904 the maximum number, 20,236, was shown for June, and the minimum number, 19,402, for August, the latter number being equal to 95.9 per cent of the former.

Table 7

STATE.	WAGE EARNERS EMPLOYED IN THE CHEMICAL INDUSTRY: 1909 ¹												
	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	23,714	22,609	22,772	22,968	23,241	23,661	23,782	23,747	23,540	23,943	24,355	24,873	25,073
Illinois.....	836	707	660	735	805	809	853	868	858	863	917	993	968
Massachusetts.....	1,358	1,317	1,287	1,333	1,346	1,412	1,364	1,365	1,375	1,354	1,411	1,397	1,341
Michigan.....	3,174	2,960	2,997	3,039	2,889	3,077	3,156	3,248	3,350	3,330	3,292	3,347	3,405
Missouri.....	619	601	601	603	609	616	625	624	631	603	637	648	632
New Jersey.....	5,046	4,858	4,968	5,067	5,147	5,072	5,094	4,990	4,780	5,038	5,109	5,173	5,252
New York.....	5,746	5,561	5,621	5,480	5,625	5,680	5,795	5,797	5,706	5,768	5,824	5,965	6,130
Ohio.....	1,132	1,077	1,070	1,106	1,147	1,143	1,061	1,078	1,123	1,138	1,172	1,242	1,237
Pennsylvania.....	3,185	3,101	3,117	3,072	3,087	3,201	3,311	3,195	3,193	3,167	3,207	3,277	3,292

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

In Massachusetts the greatest number of wage earners was employed in May, and in Pennsylvania, in June; but in the six other states shown in the table either November or December was the month of maximum employment. The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for a larger number of states in Table 52.

Prevailing hours of labor.—In Table 8 the wage earners in the industry have been classified according to the hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Over half (56.2 per cent) of the wage earners employed in the industry in 1909 were in establishments where the prevailing hours were 60 or more per week. The largest single group shown in the table is that made up of the wage earners in establishments where the prevailing hours were between 54 and 60 per week, such wage earners constituting 38.8 per cent of the total number. Between 54 and 60 hours per week was the most common working time reported in Massachusetts, New Jersey, and New York. In Ohio and Pennsylvania the most common working time was 60 hours per week, in Illinois it was between 60 and 72 hours per week, and in Michigan it was 72 hours or over, while in Missouri it was between 48 and 54 hours per week.

CHARACTER OF OWNERSHIP.

Table 9 presents statistics with respect to the character of ownership of the establishments in the industry in the United States.

Table 8

STATE.	AVERAGE NUMBER OF WAGE EARNERS IN THE CHEMICAL INDUSTRY: 1909							
	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	23,714	77	703	383	9,213	6,581	2,050	4,707
Illinois.....	836	10	14	38	180	487	107	107
Massachusetts.....	1,358	8	8	16	1,033	241	62	62
Michigan.....	3,174	.....	.....	2	1,426	35	174	1,537
Missouri.....	619	.....	374	7	.....	210	.....	28
New Jersey.....	5,046	6	20	90	2,804	992	198	936
New York.....	5,746	38	190	61	3,599	1,324	37	497
Ohio.....	1,132	2	.....	3	164	586	13	364
Pennsylvania.....	3,185	5	98	.....	68	2,130	177	707

Table 9

CHARACTER OF OWNERSHIP.	CHEMICAL INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	349	275	\$117,688,887	\$75,222,249
Individual.....	58	30	1,176,233	1,581,911
Firm.....	25	38	1,222,277	7,854,209
Corporation.....	266	207	115,290,377	65,786,129
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	16.6	10.9	1.0	2.1
Firm.....	7.2	13.8	1.0	10.4
Corporation.....	76.2	75.3	98.0	87.5

In 1909, 76.2 per cent of the total number of establishments were under corporate ownership, as compared with 75.3 per cent in 1904. In 1909 the value of products of these establishments represented 98 per cent of the total for the industry, and in 1904, 87.5 per cent.

Table 10 gives statistics for establishments classified according to form of ownership for the eight states employing an average of more than 500 wage earners in 1909 for which figures can be shown without disclosing individual operations.

STATE.	CHEMICAL INDUSTRY.											
	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	58	25	266	233	206	23,275	\$1,176,233	\$1,222,277	\$115,290,377	\$501,470	\$385,495	\$52,700,386
Illinois.....		1	18		(X)	836		(X)	4,658,274		(X)	1,760,474
Massachusetts.....	5	2	17	18	(X)	1,340	146,992	(X)	5,769,459	43,053	(X)	2,825,145
Michigan.....	19	3	14	20	(X)	5	3,149	6,456	12,836,877	35,420	4,064	7,778,341
Missouri.....		1	8		(X)		619		5,640,116		(X)	1,416,152
New Jersey.....	2	1	47	7		5,039	65,225	(X)	22,758,915	28,438	(X)	10,538,224
New York.....	12	4	58	105	12	5,629	749,025	74,218	34,522,829	303,022	46,259	15,288,237
Ohio.....	9	2	22	23	(X)	1,104	100,069	(X)	7,641,976	55,632	(X)	2,958,067
Pennsylvania.....	4	6	27	55	94	3,036	63,209	770,822	15,144,131	48,219	144,048	5,585,974

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for establishments under firm ownership have been consolidated with those for establishments under some other forms of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

In 1909, 23,275 wage earners, or 98.1 per cent of the total, were employed in establishments under corporate ownership; 206, or nine-tenths of 1 per cent, in those under firm ownership; and 233, or 1 per cent, in those owned by individuals. Establishments operated by corporations were the most numerous class in every state for which figures are given in the table except Michigan, and in every state corporations reported all but an insignificant proportion of the value of products.

SIZE OF ESTABLISHMENTS.

Classification by value of products.—Table 11 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	CHEMICAL INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	349	275	\$117,686,687	\$75,222,249
Less than \$5,000.....	51	17	110,922	48,778
\$5,000 and less than \$20,000.....	50	46	558,731	531,215
\$20,000 and less than \$100,000.....	97	95	4,985,195	4,722,925
\$100,000 and less than \$1,000,000.....	120	99	41,227,479	33,622,414
\$1,000,000 and over.....	31	18	70,806,580	36,296,917
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	14.6	6.2	0.1	0.1
\$5,000 and less than \$20,000.....	14.3	16.7	0.5	0.7
\$20,000 and less than \$100,000.....	27.8	34.5	4.2	6.3
\$100,000 and less than \$1,000,000.....	34.4	36.0	35.0	44.7
\$1,000,000 and over.....	8.9	6.5	60.2	48.3

In 1909, 8.9 per cent of the establishments in the industry manufactured products valued at \$1,000,000 or over, as against 6.5 per cent in 1904. While such establishments represented a small proportion of the total number at both censuses, they reported 60.2 per cent of the total value of products in 1909 and 48.3 per cent in 1904. Establishments manufacturing products valued at \$100,000 but less than \$1,000,000 reported 35 per cent of the total value for the industry for 1909, as compared with 44.7 per cent for 1904.

The average value of products per establishment increased from \$273,535 in 1904 to \$337,217 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$120,581 to \$153,488. The average number of wage earners per establishment shows a decrease from 72 in 1904 to 67.9 in 1909.

Classification by number of wage earners.—Table 12 classifies the establishments in the 10 leading states according to the number of wage earners employed.

Of the 349 establishments reported for 1909, 3.2 per cent employed no wage earners, 32.7 per cent employed from 1 to 5 wage earners each, 25.5 per cent from 6 to 20, 17.8 per cent from 21 to 50, 7.4 per cent from 51 to 100, and 6.6 per cent from 101 to 250. There were only 24 establishments that employed more than 250 wage earners. Of these, 11 employed over 500. More than three-fifths (61 per cent) of the wage earners in the industry worked in establishments employing over 250 wage earners, and about two-fifths (40.7 per cent) in establishments employing over 500.

Table 12

STATE.	CHEMICAL INDUSTRY: 1909																		
	Total.		Establishments employing—																
			No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
Es-tab-lish-ments.	Wage earners (average number)	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States.....	349	23,714	11	114	305	89	1,127	62	2,138	26	1,866	23	3,818	13	4,810	7	4,838	4	4,814
Illinois.....	19	836	.....	2	9	11	138	3	102	2	114	.....	1	473	.....	.....	.....	.....	.....
Indiana.....	4	504	.....	1	3	.....	.....	2	58	.....	.....	.....	1	443	.....	.....	.....	.....	.....
Massachusetts.....	24	1,358	.....	14	33	4	52	2	89	.....	.....	2	355	2	329	.....	.....	.....	.....
Michigan.....	36	3,174	7	18	26	3	38	1	24	1	96	3	495	1	328	.....	.....	2	2,167
Missouri.....	9	619	.....	.....	.....	3	25	4	143	1	85	.....	1	366	.....	.....	.....	.....	.....
New Jersey.....	50	5,046	1	11	38	9	138	13	445	8	645	2	333	3	977	2	1,296	1	1,174
New York.....	74	5,746	.....	22	74	17	222	15	546	8	537	8	1,490	2	690	1	714	1	1,473
Ohio.....	33	1,132	2	13	27	12	160	2	57	1	58	1	126	2	704	.....	.....	.....	.....
Pennsylvania.....	37	3,185	.....	9	28	10	137	10	374	2	128	3	496	.....	.....	3	2,022	.....	.....
Virginia.....	4	895	.....	.....	.....	1	11	2	78	.....	.....	.....	.....	.....	1	806	.....	.....	.....

EXPENSES.

As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$93,991,193, distributed as follows: Cost of materials, \$64,121,536, or 68.2 per cent; wages, \$14,084,501, or 15 per cent; salaries, \$6,136,588 or 6.5 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$9,648,568, or 10.3 per cent.

The variations among the states in the proportions represented by the several classes of expenses (see Table 52) are due largely to diversity of products and to differences with respect to the amount of duplication in the cost of materials reported.

ENGINES, POWER, AND FUEL.

Engines and power.—Table 13 shows statistics of power used in the industry as reported at the censuses of 1909, 1904, and 1899. The figures for 1899 include those for establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids, and in wood distillation. As the total primary power reported for these industries in 1909 amounted to only 16,348 horsepower, this inclusion does not seriously affect the comparability of the figures.

The total primary power used in the chemical industry more than doubled during the decade. In 1909, as in 1904 and 1899, power generated by steam engines was the most important form of power used in

the industry, although such power represented a much smaller proportion of the total primary power in 1909 than in 1899, this decrease being due mainly to the great increase in the amount of rented electric power used. The horsepower of electric motors used for distributing power by means of current generated in the establishment reporting shows a great increase for the decade.

Table 13

POWER.	CHEMICAL INDUSTRY.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899 ¹	1909	1904	1899 ¹	1909	1904	1899 ¹
Primary power, total.....	2,202	1,397	1,173	208,604	132,262	90,349	100.0	100.0	100.0
Owned.....	1,304	1,134	1,173	115,701	78,198	71,866	55.5	59.1	79.5
Steam.....	1,231	1,081	1,091	103,273	70,194	69,560	49.5	53.1	77.0
Gas.....	34	25	17	1,147	438	361	0.5	0.3	0.4
Water wheels.....	30	25	65	10,913	6,455	1,915	5.2	4.9	2.1
Water motors.....	9	3	(?)	153	14	(?)	0.1	(?)	(?)
Other.....	.....	.....	.....	215	1,097	30	0.1	0.8	(?)
Rented.....	898	263	(?)	92,903	54,064	18,483	44.5	40.9	20.5
Electric.....	898	263	(?)	92,057	10,078	418,231	44.1	7.6	20.2
Other.....	.....	.....	.....	846	43,986	252	0.4	33.3	0.3
Electric motors.....	2,179	672	79	156,639	18,188	20,263	100.0	100.0	100.0
Run by current generated by establishment.....	1,281	409	79	64,642	8,110	2,032	41.3	44.6	10.0
Run by rented power.....	898	263	(?)	92,057	10,078	18,231	58.7	55.4	90.0

¹ Figures include those for establishments engaged in the manufacture of sulphuric, nitric, and mixed acids, and in wood distillation.

² Not reported.

³ Less than one-tenth of 1 per cent.

⁴ In some instances includes electric energy used in electrolytic and electrometallurgical processes.

Table 14 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in eight of the leading states.

Table 14

STATE.	CHEMICAL INDUSTRY: 1909																
	Primary horsepower.								Electric horsepower.		Fuel used.						
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States..	285	208,604	115,701	103,273	1,147	11,066	215	92,067	846	156,699	64,642	650,480	2,161,768	63,520	3,844	110,276	1,300,265
Illinois.....	18	5,907	5,639	5,625	14	.....	.....	43	225	3,913	3,870	.....	150,942	1,026	.....	38	13,840
Massachusetts.....	21	3,731	2,494	2,264	150	15	65	1,232	5	1,855	623	6,234	35,099	9,764	17	357	159
Michigan.....	14	26,594	23,835	23,681	4	150	.....	2,759	.....	5,281	2,522	1	1,065,882	320	2,194	2,440	.....
Missouri.....	9	886	855	855	.....	.....	.....	31	.....	221	190	.....	40,069	786	.....	.....	2,852
New Jersey.....	47	13,880	13,821	13,751	20	.....	50	8	51	3,835	3,827	215,265	76,734	1,863	50	3,939	1,850
New York.....	64	116,197	30,264	26,086	78	4,000	100	85,713	220	136,519	50,806	366,505	105,056	3,514	54	6,872	229,978
Ohio.....	28	11,715	11,706	11,473	232	1	.....	9	.....	395	386	.....	160,558	23,231	360	403	876,615
Pennsylvania.....	32	9,771	9,271	8,671	600	.....	.....	500	.....	1,875	1,375	57,575	298,534	6,008	126	27,378	35,723
All other states....	52	19,923	17,816	10,867	49	6,900	.....	1,762	345	2,805	1,043	4,900	228,894	17,008	843	68,849	139,248

In 1909 New York alone reported 116,197 horsepower, or 55.7 per cent of the aggregate for the industry. The most important form of power reported from New York was rented electric power, a predominance due in the main to the importance of electrochemical establishments supplied with power from Niagara

Falls. Steam power was the most important form of power in all of the other states shown separately.

Fuel consumed.—Bituminous coal was the principal class of fuel used in the industry in 1909, Michigan reporting nearly one-half of the total. In New York and New Jersey anthracite coal was chiefly used.

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

MATERIALS.

Summary for the United States.—Table 15 shows statistics of the materials used in the industry for 1909, 1904, and 1899, only such specific materials being shown as were separately reported in 1909. In order to make the figures for 1899 comparable with those for the other two censuses, the figures for establishments engaged in the manufacture of sulphuric, nitric, and mixed acids, and in wood distillation have been excluded from the figures for that year in all tables giving comparative statistics of materials and products.

The relative increase in the cost of all materials for the decade 1899–1909 was 137 per cent. Detailed information is available for but a few of the numerous materials consumed in the industry, and the cost of these represented less than one-twelfth (7.8 per cent) of the total cost of all materials in 1909.

The expenditures for sulphuric, nitric, and mixed acids purchased and for raw materials for making such acids—sulphur, pyrites, and nitrate of soda—increased from \$2,035,276 in 1899 to \$4,277,550 in 1909, or 110.2 per cent, and represented 85.2 per cent of the total cost of the materials shown separately, other than fuel and rent of power, in 1909. These amounts do not include, of course, the quantity of such materials used in establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids.

The quantity of acids and other chemicals that establishments in the industry made for their own use

in the manufacture of their finished products was reported in the majority of cases, and is given in connection with the statistics as to products.

Table 15

MATERIAL.	MATERIALS USED IN THE CHEMICAL INDUSTRY.		
	1909	1904	1899
Total cost.....	\$64,121,536	\$42,082,811	\$27,057,609
Sulphur:			
Tons.....	50,523	28,482	30,438
Cost.....	\$1,030,345	\$591,700	\$621,614
Pyrites:			
Tons.....	227,358	186,360	127,002
Cost.....	\$1,060,256	\$778,209	\$558,810
Nitrate of soda:			
Tons.....	25,818	17,615	8,591
Cost.....	\$1,147,256	\$751,968	\$276,091
Sulphuric acid:			
Tons.....	58,552	104,489	37,832
Cost.....	\$564,390	\$945,486	\$429,903
Nitric acid:			
Tons.....	1,525	3,068	1,220
Cost.....	\$139,591	\$320,818	\$127,811
Mixed acids:			
Tons.....	4,546	1,734	275
Cost.....	\$335,672	\$156,605	\$21,047
Ammonium sulphate:			
Tons.....	1,675	5,676	4,373
Cost.....	\$88,013	\$356,109	\$471,117
Alcohol:			
Grain—			
Gallons.....	479,428	187,389	120,474
Cost.....	\$287,416	\$449,604	\$263,472
Wood—			
Gallons.....	949,212	601,077	(¹)
Cost.....	\$370,017	\$367,223	(¹)
Fuel and rent of power.....	\$8,046,840	\$4,541,589	
All other materials.....	\$51,051,700	\$32,803,300	\$24,287,744

¹ Comparable figures not available.

Materials, by states.—Table 16 gives, by states, statistics for the materials shown separately for the chemical industry in Table 15, with the exception of fuel and rent of power, for 1909.

Table 16

MATERIAL AND STATE.	SPECIFIED MATERIALS USED IN THE CHEMICAL INDUSTRY: 1909		MATERIAL AND STATE.	SPECIFIED MATERIALS USED IN THE CHEMICAL INDUSTRY: 1909	
	Quantity.	Cost.		Quantity.	Cost.
Sulphur	<i>Tons.</i> 50,523	\$1,030,345	Nitric acid	<i>Tons.</i> 1,526	\$139,581
Massachusetts.....	2,914	61,843	New Jersey.....	893	93,916
New Jersey.....	16,038	340,212	New York.....	405	34,261
New York.....	16,352	326,926	All other states.....	227	11,414
Pennsylvania.....	6,419	141,931	Mixed acids	4,648	335,872
All other states.....	8,800	159,433	New Jersey.....	2,644	193,850
Pyrites	227,853	1,060,258	All other states.....	1,902	141,822
New Jersey.....	52,507	269,547	Ammonium sulphate	1,676	88,013
Pennsylvania.....	92,364	412,047			
All other states.....	82,487	378,662			
Nitrate of soda	25,818	1,147,296			
Massachusetts.....	4,262	191,594	Alcohol, grain	<i>Gallons.</i> 479,423	287,416
New Jersey.....	10,604	446,284	Missouri.....	18,251	30,112
Pennsylvania.....	4,259	184,447	New Jersey.....	232,174	105,268
All other states.....	6,693	324,471	New York.....	153,414	101,914
Sulphuric acid	58,552	664,390	All other states.....	75,589	50,122
Illinois.....	5,308	37,305	Alcohol, wood	949,212	370,017
Massachusetts.....	1,480	15,266	New Jersey.....	801,570	299,937
Missouri.....	3,214	28,756	New York.....	25,451	12,018
New Jersey.....	13,038	135,049	All other states.....	122,191	58,062
New York.....	7,288	119,240			
Ohio.....	2,510	27,221			
Pennsylvania.....	3,262	34,406			
All other states.....	22,452	167,147			

PRODUCTS.

Summary for the United States.—Table 17 shows the quantity and value of the leading individual classes of chemical products manufactured in 1909, 1904, and 1899 by establishments in the industry. As previously noted, the figures for 1899 are exclusive of those

for establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids and in wood distillation. The quantities and values of some of the products in this table do not agree with those in the Abstract of the Thirteenth Census and in Volume VIII, because it was found necessary to revise the figures.

The total value of products for the industry in 1909 amounted to \$117,688,887, as compared with \$48,039,595 in 1899, the increase for the decade being \$69,649,292, or 145 per cent. Each of the groups of products shown in the table contributed to the increase except potashes, which show a decrease. The group showing the largest relative increase in value for the decade is that comprising chemical substances produced by the aid of electricity (Group VIII), the value of which was nearly fourteen times as great in 1909 as in 1899, the absolute increase amounting to \$16,662,909. Compressed and liquefied gases (Group X) rank next in respect to relative increase in value during the decade, the value in 1909 being more than four times as great as in 1899. The value of plastics more than trebled during the decade, that of fine chemicals more than doubled, and that of acids was almost four times as great. Sodas rank next to chemicals produced by the aid of electricity in amount of absolute increase in value for the decade (\$9,821,067).

Table 17

Group.	PRODUCT.	PRODUCTS OF THE CHEMICAL INDUSTRY.			Group.	PRODUCT.	PRODUCTS OF THE CHEMICAL INDUSTRY.		
		1909	1904	1899			1909	1904	1899
	Total value	\$117,688,887	\$75,222,249	\$48,039,595					
I	Acids ^a	\$11,926,389	\$7,583,059	\$3,161,743	IV	Alums	\$2,578,842	\$2,126,612	\$2,013,607
	Acetic—					Alum cake—			
	Pounds.....	51,963,788	27,001,322	24,945,558		Pounds.....	26,884,880	(^o)	(^o)
	Value.....	\$1,136,134	\$537,542	\$396,323		Value.....	\$273,711	(^o)	(^o)
	Boric—					Potash alum—			
	Pounds.....	5,554,414	6,956,896	2,684,935		Pounds.....	7,939,702	(^o)	(^o)
	Value.....	\$295,739	\$527,190	\$198,212		Value.....	\$128,623	(^o)	(^o)
	Citric—					Other.....	\$2,176,508	(^o)	(^o)
	Pounds.....	2,102,206	2,265,631	(^o)	V	Coal-tar products	\$2,675,327	\$344,817	\$1,322,094
	Value.....	\$777,200	\$598,718	(^o)		Coal-tar distillery products.....	\$2,462,330	\$340,641	\$809,830
	Hydrofluoric—					Chemicals made from coal-tar distillery products.....	\$212,997	\$504,176	\$512,264
	Pounds.....	4,790,963	2,932,358	698,000	VI	Cyanides	\$1,941,893	\$1,179,104	\$1,584,923
	Value.....	\$214,657	\$151,218	\$34,890		Yellow prussiate of potash—			
	Muriatic—					Pounds.....	3,510,208	5,027,264	6,140,406
	Pounds.....	128,394,736	127,502,682	116,675,109		Value.....	\$463,983	\$683,277	\$993,514
	Value.....	\$1,171,082	\$1,180,910	\$1,015,915		Other.....	\$1,477,910	\$495,827	\$591,409
	Oleic—				VII	Bleaching materials	\$1,635,046	\$777,750	\$492,086
	Pounds.....	13,337,717	(^o)	(^o)		Hydrogen peroxide—			
	Value.....	\$680,015	(^o)	(^o)		Pounds.....	9,403,717	(^o)	(^o)
	Phosphoric—					Value.....	\$850,417	(^o)	(^o)
	Pounds.....	25,702,606	991,050	(^o)		Bisulphites—			
	Value.....	\$505,791	\$68,541	(^o)		Pounds.....	28,656,000	(^o)	(^o)
	Other.....	\$7,145,771	\$4,518,940	\$1,516,403		Value.....	\$202,504	(^o)	(^o)
II	Sodas	\$21,417,982	\$16,858,929	\$11,596,915		Other.....	\$582,125	(^o)	(^o)
	Soda ash—				VIII	Chemical substances produced by the aid of electricity	\$17,968,277	\$5,896,632	\$1,305,368
	Tons.....	646,007	518,789	386,361		Calcium carbide—			
	Value.....	\$10,361,756	\$8,202,292	\$4,768,383		Pounds.....	121,946,967	(^o)	(^o)
	Sal soda—					Value.....	\$2,984,001	(^o)	(^o)
	Tons.....	76,285	56,870	63,231		Cautic soda—			
	Value.....	\$977,712	\$792,248	\$779,166		Tons.....	19,428	(^o)	(^o)
	Bicarbonate of soda—					Value.....	\$1,032,647	(^o)	(^o)
	Tons.....	82,800	68,867	68,185		Chlorates—			
	Value.....	\$1,615,031	\$1,135,610	\$1,324,843		Pounds.....	11,568,915	(^o)	(^o)
	Caustic soda—					Value.....	\$904,525	(^o)	(^o)
	Tons.....	112,152	80,159	78,779		Hydrochlorites—			
	Value.....	\$4,230,954	\$2,924,182	\$2,917,955		Tons.....	45,976	(^o)	(^o)
	Borax—					Value.....	\$1,506,831	(^o)	(^o)
	Tons.....	20,154	20,882	5,637		Other.....	\$11,540,273	(^o)	(^o)
	Value.....	\$1,766,910	\$2,122,808	\$502,430					
	Other.....	\$2,565,619	\$1,681,789	\$1,304,088					
III	Potashes								
	Pounds.....	1,866,570	1,811,037	3,764,806					
	Value.....	\$88,940	\$104,655	\$174,476					

NOTE.—For notes corresponding to the reference figures in Table 17, refer to the end of table on page 10.

Table 17—Continued.		PRODUCTS OF THE CHEMICAL INDUSTRY.			Table 17—Continued.		PRODUCTS OF THE CHEMICAL INDUSTRY.		
Group.	PRODUCT.	1909	1904	1899	Group.	PRODUCT.	1909	1904	1899
IX	Plastics.....	\$7,180,172	\$4,755,761	\$2,099,400	XI	Fine chemicals—Continued.			
	Pyroxylin plastics—					Ether			
	Pounds.....	6,206,177	(?)	(?)		Pounds.....	1,177,886	660,783	263,238
	Value.....	\$5,389,819	\$2,857,093	\$1,970,387		Value.....	\$199,448	\$334,935	\$129,876
	Other—					Acetone—			
	Pounds.....	10,234,928	(?)	(?)		Pounds.....	6,927,886	1,300,395	1,638,715
	Value.....	\$1,790,353	\$1,898,668	\$129,013		Value.....	\$719,895	\$161,320	\$178,666
X	Compressed or liquefied gases...	\$4,969,805	\$2,787,689	\$1,215,011		Other.....	\$5,199,584	\$4,248,898	\$1,426,373
	Anhydrous ammonia—				XII	Chemicals, not elsewhere specified:			
	Pounds.....	11,802,076	(?)	(?)		Glycerin—			
	Value.....	\$2,503,315	\$1,173,184	\$448,157		Pounds.....	33,986,974	18,791,997	15,383,798
	Carbon dioxide—					Value.....	\$4,838,826	\$2,345,205	\$2,012,586
	Pounds.....	47,498,937	35,991,627	(?)		Epsom salts—			
	Value.....	\$2,326,481	\$1,343,966	\$696,164		Pounds.....	21,546,297	15,936,837	6,072,309
	Laughing gas—					Value.....	\$189,291	\$145,601	\$45,966
	Pounds.....	72,675	(?)	(?)		Blue vitriol—			
	Value.....	\$33,689	(?)	(?)		Pounds.....	810,958	50,100	7,500,000
	Oxygen—					Value.....	\$37,626	\$2,500	\$375,000
	Cubic feet.....	637,064	(?)	(?)		Copperas—			
	Value.....	\$98,150	(?)	(?)		Pounds.....	24,199,526	8,816,059	14,097,905
	Other—					Value.....	\$71,081	\$28,061	\$58,581
	Value.....	\$8,170	\$270,539	\$70,690		Phosphates of soda—			
XI	Fine chemicals.....	\$10,956,666	\$9,145,853	\$4,220,339		Pounds.....	24,541,801	12,018,815	3,478,350
	Alkaloids—					Value.....	\$539,001	\$243,822	\$104,554
	Ounces.....	3,482,492	4,949,525	3,387,522		Tin compounds—			
	Value.....	\$3,188,691	\$2,925,789	\$1,743,264		Pounds.....	10,293,377	9,573,719	4,677,471
	Gold salts—					Value.....	\$1,535,350	\$904,679	\$470,159
	Ounces.....	42,544	59,969	8,594		Zinc salts—			
	Value.....	\$430,944	\$449,864	\$90,145		Pounds.....	20,741,225	(?)	(?)
	Silver salts—					Value.....	\$368,799	(?)	(?)
	Ounces.....	2,027,719	1,743,882	1,252,604		Other chemicals.....	\$22,239,550	\$13,748,250	\$15,786,487
	Value.....	\$726,222	\$683,761	\$499,345		By-products and residues sold to other industries.....	\$4,530,024	\$5,743,070	
	Platinum salts—								
	Ounces.....	1,561	19,068	7,312					
	Value.....	\$19,123	\$175,682	\$54,600					
	Chloroform—								
	Pounds.....	1,861,435	616,670	396,540					
	Value.....	\$472,759	\$165,604	\$98,070					

¹ In addition, the following products were produced in 1909 by establishments engaged primarily in the manufacture of products other than those covered by the industry designation:

	Pounds.	Value.		Pounds.	Value.
Total.....		\$9,105,458	Pyroxylin plastics.....		\$292,560
Acids:			Compressed or liquefied gases:		
Acetic.....	4,959,985	200,740	Anhydrous ammonia ^c	167,770	40,923
Hydrofluoric.....	2,051,951	79,722	Carbon dioxide.....	454,354	19,262
Muriatic.....	74,820,143	587,253	Laughing gas.....	24,500	4,900
Oleic.....	2,959,346	165,091	Oxygen gallons.....	23,826,325	79,319
Stearic.....	5,094,774	399,386	Other.....		9,072
Other ^a		49,530	Chloroform.....	8,250	4,779
Sodas:			Acetone.....	2,007,564	210,287
Sal soda..... tons..	10,822	184,297	Glycerin ^d	1,022,920	123,472
Other ^b tons..		778,237	Blue vitriol.....	37,185,585	1,496,645
Alums.....	33,854,100	251,393	Copperas.....	3,031,566	53,372
Coal-tar distillery products.....		1,610,792	Phosphates of soda.....	310,588	27,034
Bleaching materials:			Zinc salts.....	4,312,988	103,503
Hydrogen peroxide.....	521,851	20,124	Other chemicals.....		2,269,412
Bisulphite.....	3,062,000	23,650			
Other.....		20,708			

^a Not including acids reported by manufacturers of explosives and fertilizers.
^b Including sodas reported by manufacturers of paints and varnishes and fertilizers.
^c Not including 4,871,014 pounds, valued at \$448,455, reported by manufacturers of coke.
^d Not including 52,518,919 pounds, valued at \$6,790,264, reported by manufacturers of soap.

² In addition, similar products to the value of \$3,063,397 were produced in 1904 by establishments engaged primarily in the manufacture of products other than those covered by the industry designation:

	Pounds.	Value.		Pounds.	Value.
Total.....		\$3,063,397	Coal-tar distillery products.....		\$238,645
Acids:			Bleaching materials:		
Muriatic.....	47,018,080	431,938	Bisulphite tons.....	536	\$11,937
Stearic.....	1,750,000	140,000	Glycerin.....	520,000	53,000
Hydrofluoric.....	1,217,578	71,668	Ether.....	193,628	92,466
Other.....		146,716	Epsom salts.....	1,350,000	13,500
Sodas:			Blue vitriol.....	107,160	5,994
Sal soda..... tons..	1,763	29,561	Copperas.....	81,816	586
Caustic..... tons..		668	Tin salts.....	1,103,222	188,301
Other..... tons..	14,200	363,765	Other chemicals.....		742,467
Alums.....	33,074,349	532,185			

³ For sulphuric, nitric, and mixed acids, see special report therefor.
⁴ Not reported separately.
⁵ See "Chemical substances produced by the aid of electricity" for additional product.
⁶ Figures not available.
⁷ Not reported.

Table 18 shows the per cent distribution of the total value of products by groups for 1909, 1904, and 1899.

Group.	PRODUCT.	PER CENT OF TOTAL VALUE OF PRODUCTS.		
		1909	1904	1899
	Total value of products.....	100.0	100.0	100.0
I	Acids.....	10.1	10.1	6.6
II	Sodas.....	18.2	22.4	24.1
III	Potashes.....	0.1	0.7	0.4
IV	Alums.....	2.2	2.8	4.2
V	Coal-tar products.....	2.3	1.1	2.8
VI	Cyanides.....	1.7	1.6	3.3
VII	Bleaching materials.....	1.4	1.0	1.0
VIII	Chemicals produced by the aid of electricity.....	15.3	7.8	2.7
IX	Plastics.....	6.1	6.3	4.4
X	Compressed and liquefied gases.....	4.2	3.7	2.5
XI	Fine chemicals.....	9.3	12.2	8.8
XII	Chemicals not elsewhere specified.....	25.3	22.6	39.2
XIII	By-products and residues.....	3.8	7.6	

Leaving out of consideration Group XII (chemicals not elsewhere specified), which is a miscellaneous group including a number of widely differing products, sodas (Group II) constitute the most important group, contributing nearly one-fifth (18.2 per cent) of the total value of products for the industry in 1909, although the proportion was somewhat less than in either 1904 or 1899.

Chemicals produced by the aid of electricity (Group VIII) rank second in importance in 1909, representing 15.3 per cent of the total value, as against only 2.7 per cent in 1899, while acids rank third with 10.1 per cent of the total, the same proportion as in 1904. Fine chemicals (Group XI), which ranked next to sodas in 1904, had dropped to fourth place in 1909.

Products, by states.—Table 19 shows, by states, the quantities and values of such of the more important products of the chemical industry in 1909 as can be

shown by states, and the quantities produced in 1904 and 1899, so far as this can be done without disclosing individual operations.

PRODUCT AND STATE.	SPECIFIED PRODUCTS OF THE CHEMICAL INDUSTRY, BY STATES.				PRODUCT AND STATE.	SPECIFIED PRODUCTS OF THE CHEMICAL INDUSTRY, BY STATES.			
	Value: 1909	Quantity.				Value: 1909	Quantity.		
		1909	1904	1899			1909	1904	1899
Potashes	\$88,940	<i>Pounds.</i> 1,866,570	<i>Pounds.</i> 1,811,037	<i>Pounds.</i> 3,764,806	Compressed and liquefied gases—Continued. Carbon dioxide (carbonic acid gas)	\$2,317,808	<i>Pounds.</i> 47,238,267	<i>Pounds.</i> (²)	<i>Pounds.</i> (²)
Michigan.....	53,319	1,049,102	1,869,116	California.....		121,491	2,798,230		
Ohio.....	5,760	91,117	652,200	Illinois.....		399,746	11,169,540		
All other states.....	29,861	726,351	1,043,490	New York.....		548,893	10,738,557		
				Ohio.....		158,888	2,538,736		
Alums	2,578,842	<i>Tons.</i> 113,422	<i>Tons.</i> 84,518	<i>Tons.</i> 76,260	Pennsylvania.....	163,330	3,067,480		
Pennsylvania.....	1,139,000	42,137	50,416	38,216	All other states.....	925,460	16,875,722		
All other states.....	1,439,842	71,285	34,100	38,044					
Coal-tar products	2,675,327				Oxygen	88,150	<i>Cubic feet.</i> 637,000	(²)	(²)
Ohio.....	607,514				Massachusetts.....	15,409	82,000		
Pennsylvania.....	318,946				New York.....	58,110	392,000		
All other states.....	1,748,867				All other states.....	24,631	163,000		
Bleaching materials:					Fine chemicals:		<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
Hydrogen peroxide	850,417	4,702	(²)	(²)	Gold salts	430,844	42,544	59,969	8,594
New York.....	691,008	3,434			Pennsylvania.....	35,630	3,059	6,435	2,500
All other states.....	159,409	1,268			All other states.....	395,314	39,485	53,534	6,094
Bisulphites	202,504	14,328	(²)	(²)	Silver salts	726,222	2,027,719	1,743,882	1,252,604
Massachusetts.....	142,841	9,450			Pennsylvania.....	299,414	863,128	521,161	650,907
All other states.....	59,663	4,878			All other states.....	426,808	1,164,591	1,222,721	601,697
Electrochemical products:					Chloroform	472,758	1,861,435	816,670	398,540
Caustic soda	1,032,647	19,428	(²)	(²)	New York.....	417,204	1,647,506	150,000	62,540
New York.....	925,638	16,145			All other states.....	55,555	213,929	466,670	334,000
All other states.....	107,009	3,283			Chemicals not otherwise specified:				
Hypochlorites	1,506,831	45,976	(²)	(²)	Copperas	71,081	24,199,526	8,815,059	14,097,805
New York.....	1,113,887	28,591			Pennsylvania.....	48,062	21,531,000	6,932,050	3,000,000
All other states.....	392,944	17,385			All other states.....	23,019	2,668,526	1,883,009	11,097,905
Compressed and liquefied gases:					Phosphates of soda	539,001	24,541,801	12,018,815	3,478,350
Anhydrous ammonia	2,503,315	<i>Pounds.</i> 11,802,078	<i>Pounds.</i> (²)	<i>Pounds.</i> (²)	New Jersey.....	377,667	17,212,576	6,428,552	2,630,000
New Jersey.....	319,590	1,386,927			All other states.....	161,334	7,329,225	5,590,263	3,478,350
All other states.....	2,183,725	10,415,149			Tin compounds	1,535,350	10,293,377	9,573,718	4,877,471
					New Jersey.....	741,893	7,458,981	2,869,500	3,130,578
					All other states.....	793,457	2,834,396	6,704,219	1,546,893

¹ Exclusive of 3,302,669 pounds of potash salts which were combined with potashes in general report.

² Figures not available.

Individual groups of products.—Group I—Acids.—The first of the groups into which the products of the chemical industry are divided comprises the acids of commerce. The production of sulphuric, nitric, and mixed acids by establishments manufacturing them as primary products is, however, not included, such establishments constituting a separate industry under the classification employed by the Bureau of the Census. A considerable amount of these acids (chiefly sulphuric acid) was, however, produced by establishments engaged primarily in the chemical industry as defined by the Bureau of the Census, and this production is included in Table 17 under the heading of "Other acids," contributing the greater part of the value shown for this item. The total production of sulphuric, nitric, and mixed acids in all industries, so far as reported, is shown in the special report on the manufacture of these acids.

Muriatic or hydrochloric acid is the most important of the acids shown separately in Table 17, its value representing 9.8 per cent of the total for the group in 1909. Table 20 shows statistics for 1909, 1904, and 1899 of the production of muriatic acid by all establishments, including that consumed in the establishments where produced; the latter constituting 17 per cent of total production in 1909 and 13.1 per cent in 1899.

	TOTAL PRODUCTION OF MURIATIC ACID—ALL INDUSTRIES.					
	1909	1904	1899	Per cent of increase. ¹		
				1899-1909	1904-1909	1899-1904
Number of establishments reporting.....	38	36	31	22.6	5.6	16.1
Total quantity (pounds).....	244,719,817	188,538,396	134,229,012	82.3	29.8	40.5
For sale:						
Quantity (pounds).....	203,200,479	127,502,682	116,675,109	74.2	59.4	9.3
Value.....	\$1,758,335	\$1,180,910	\$1,015,915	73.1	48.9	16.2
Consumed in establishments where produced (pounds).....	41,519,338	61,035,714	17,553,903	136.5	-32.0	247.7

¹ A minus sign (—) denotes decrease.

Table 21 shows, by states, the number of all establishments manufacturing muriatic acid in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING MURIATIC ACID.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING MURIATIC ACID.		
	1909	1904	1899		1909	1904	1899
United States.....	38	36	31	Maryland.....		1	
California.....	4	4	3	Massachusetts.....	2	3	2
Colorado.....	1	1	1	Michigan.....	3	3	1
Connecticut.....	3		1	Missouri.....	1		1
Illinois.....	3	1	3	New Jersey.....	6	5	6
Indiana.....	1	1	2	New York.....	6	5	4
Kansas.....	1	1		Ohio.....	3	2	2
Louisiana.....	1			Pennsylvania.....	3	9	5

Table 22 shows statistics for 1909, 1904, and 1899 for all establishments manufacturing acetic acid, including that consumed in the establishments where produced.

	TOTAL PRODUCTION OF ACETIC ACID—ALL INDUSTRIES.					
	1909	1904	1899	Per cent of increase. ¹		
				1899-1909	1904-1909	1899-1904
Number of establishments reporting.....	13	12	14	-7.1	8.3	-14.3
Total quantity (pounds)....	58,000,602	29,506,021	27,875,222	108.1	96.6	5.8
For sale:						
Quantity (pounds).....	56,923,773	27,074,280	26,660,555	113.5	110.2	1.6
Value.....	\$1,336,874	\$568,600	\$426,892	213.2	135.1	33.2
Consumed in establishments where produced (pounds).....	1,076,829	2,431,741	1,214,667	-11.3	-55.7	100.2

¹ A minus sign (-) denotes decrease.

Acetic acid, as considered in the census returns, does not include the acetic acid produced by the oxidation of alcohol through fermentation or otherwise, and known as vinegar. The commercial grades of acetic acid contain from 28 to 90 per cent of real acetic acid.

Table 23 shows, by states, the number of all establishments manufacturing acetic acid in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING ACETIC ACID.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING ACETIC ACID.		
	1909	1904	1899		1909	1904	1899
United States.....	13	12	14	Michigan.....	1		
Connecticut.....	2			Missouri.....	1		2
Illinois.....	1		2	New Jersey.....	2	5	2
Indiana.....	1			New York.....	1	1	3
Maryland.....		1		Pennsylvania.....	1	2	3
Massachusetts.....	3	3	2				

Of the 13 establishments reported in 1909, 8 were in the chemical industry and 5 were engaged primarily in the manufacture of other products, reporting this acid as a subsidiary product.

Table 24 shows statistics for all establishments manufacturing minor acids in 1909, 1904, and 1899, including those consumed in the establishments where produced, so far as statistics thereof are available.

PRODUCT.	TOTAL PRODUCTION OF MINOR ACIDS—ALL INDUSTRIES.					
	1909	1904	1899	Per cent of increase. ¹		
				1899-1909	1904-1909	1899-1904
Boric acid:						
Number of establishments reporting.....	5	7	3			
Quantity (pounds).....	5,554,914	6,956,896	2,684,935	106.9	-20.2	159.1
Value.....	\$295,776	\$527,190	\$198,212	49.2	-43.9	166.0
Citric acid:						
Number of establishments reporting.....	5	4	2 ³			
Quantity (pounds).....	2,102,256	2,265,631	23,886,382	(³)	-7.2	(³)
Value.....	\$777,235	\$598,718	\$335,297	(³)	29.8	(³)
Lactic acid:						
Number of establishments reporting.....	4	3	(⁴)			
Quantity (pounds).....	4,200,025	2,906,555	(⁴)		44.5	
Value.....	\$176,654	\$158,911	(⁴)		11.2	
Hydrofluoric acid:						
Number of establishments reporting.....	10	6	4			
Total quantity (pounds).....	8,027,290					
For sale—						
Quantity (pounds).....	6,842,914	2,932,358	698,000	880.4	133.4	320.1
Value.....	\$294,379	\$151,218	\$34,890	743.7	94.7	333.4
Consumed in establishments where produced (pounds).....	1,184,376	(⁵)	(⁵)			
Oleic acid:						
Number of establishments reporting.....	8	(⁵)	(⁵)			
Quantity (pounds).....	16,377,063	(⁵)	(⁵)			
Value.....	\$845,106	(⁵)	(⁵)			
Phosphoric acid:						
Number of establishments reporting.....		9	(⁶)			
Total quantity (pounds).....	50,290,006					
For sale—						
Quantity (pounds).....	26,282,839	991,050				2,552.0
Value.....	\$508,163	\$68,541	(⁶)			641.4
Consumed in establishments where produced (pounds).....	24,007,167	(⁶)	(⁶)			
Stearic acid:						
Number of establishments reporting.....		11	(⁶)			
Quantity (pounds).....	12,381,601					
For sale—						
Quantity (pounds).....	11,933,692					
Value.....	\$975,327	(⁶)	(⁶)			
Consumed in establishments where produced (pounds).....	447,909	(⁶)	(⁶)			
Other acids:						
Number of establishments reporting.....	22	15	16			
Value.....	\$2,466,283	\$1,172,119	\$1,287,481			

¹ A minus sign (-) denotes decrease.

² Includes lactic acid.

³ Figures not strictly comparable.

⁴ Included in citric acid.

⁵ Not reported.

⁶ Included in "other acids."

⁷ Includes, for 1909, tartaric, chromic, hydrofluosilicic, carbolic, pyroligneous, and molybdic acids in the order named to the value of \$759,708, and undesignated acids to the value of \$1,706,575.

Group II—Sodas.—The class of sodas, as shown in Table 17, comprises soda ash, including white or refined alkali; sal soda, including natural soda, mild mineral alkali, soda crystals, washing soda, or crystallized sodium carbonate; bicarbonate of soda, including baking soda, saleratus, and sodium hydrogen carbonate; caustic soda, including soda lye and sodium

hydroxide; borax, including borax glass, lime and sodium borates, and sodium baborate; and other soda products, under which heading are included nitrate, sulphate, and sulphide of soda made by soda establishments, and in addition the products of compounders or packers who give an added value to soda lye or the carbonate.

Table 25 shows statistics for all establishments manufacturing sodas for each census from 1889 to 1909, inclusive. In order to make the statistics for 1909 comparable with those for earlier censuses, the figures are confined to the major soda products, viz, bicarbonate of soda, caustic soda, sal soda, and soda ash.

KIND AND CENSUS.	TOTAL PRODUCTION OF SPECIFIED SODAS—ALL INDUSTRIES.		
	Number of establishments reporting.	Quantity (tons).	Value.
Total:			
1909.....	65	947,678	\$18,304,583
1904.....	63	734,209	13,357,883
1899.....	50	689,641	10,237,944
1889.....	32	168,562	5,432,400
Bicarbonate of soda:			
1909.....	7	82,800	1,515,031
1904.....		68,267	1,135,610
1899.....		68,266	1,332,765
1889.....		30,339	2,009,800
Caustic soda:			
1909.....	17	131,612	5,264,887
1904.....		86,940	3,185,959
1899.....		166,783	3,170,280
1889.....		16,501	661,114
Sal soda:			
1909.....	50	87,107	1,162,009
1904.....		59,548	831,869
1899.....		63,249	875,243
1889.....		72,322	1,581,766
Soda ash:			
1909.....	11	646,057	10,362,656
1904.....		518,954	8,204,545
1899.....		390,653	4,859,656
1889.....		47,400	1,179,720
Per cent of increase: ¹			
Total—			
1899-1909.....		37.4	78.8
1904-1909.....		29.1	37.0
1899-1904.....		8.5	30.5
1889-1899.....		314.0	88.5
Bicarbonate of soda:			
1899-1909.....		20.2	13.7
1904-1909.....		20.2	33.4
1899-1904.....		(²)	-14.8
1889-1899.....		127.0	-33.7
Caustic soda:			
1899-1909.....		-21.1	66.1
1904-1909.....		51.6	65.3
1899-1904.....		-47.9	0.5
1889-1899.....		910.7	379.5
Sal soda:			
1899-1909.....		37.7	32.8
1904-1909.....		46.3	39.7
1899-1904.....		-5.9	-5.0
1889-1899.....		-12.5	-44.7
Soda ash:			
1899-1909.....		65.4	113.2
1904-1909.....		24.5	26.3
1899-1904.....		32.8	68.8
1889-1899.....		724.2	311.9

¹ Includes 19,428 tons of caustic soda, valued at \$1,032,647, reported under "chemicals produced by the aid of electricity."
² A minus sign (-) denotes decrease.
³ Less than one-tenth of 1 per cent.

Soda ash is the most important of these products, both in quantity and value, while caustic soda ranks next. There has been a steady growth since 1889 in the quantity and value of the sodas produced, the total tonnage of these products in 1909 being more than five times and the value more than three times that in 1889. Each class with the exception of caustic soda shows a considerable relative increase in quantity for the decade 1899-1909, the largest increase (65.4 per cent) being that for soda ash.

Table 26 shows, by states, the number of all establishments manufacturing sodas in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING SODAS.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING SODAS.		
	1909	1904	1899		1909	1904	1899
United States	165	63	55	Montana.....	1	1	.....
California.....	8	6	6	Nevada.....	1	2	5
Colorado.....	1	1	.....	New Jersey.....	3	7	3
Georgia.....	2	.....	.....	New York.....	8	9	12
Illinois.....	6	4	4	Ohio.....	3	4	1
Indiana.....	3	3	2	Pennsylvania.....	3	8	9
Iowa.....	2	.....	.....	Rhode Island.....	1	.....	1
Kansas.....	2	1	.....	Virginia.....	1	1	1
Maryland.....	4	1	1	Washington.....	.....	.....	.....
Massachusetts.....	3	3	1	Wisconsin.....	3	4	4
Michigan.....	5	5	3	Wyoming.....	1	1	.....
Missouri.....	3	2	2				

¹ Includes 5 establishments producing caustic soda reported under "chemicals produced by the aid of electricity."

Group III—Potashes.—Properly speaking, the term "potash" includes only potassium carbonate in its various forms and degrees of purity. The term has long been applied, however, to potassium hydroxide or caustic potash and this substance has been included with potassium carbonate in the statistics of products given in this report. The group "potashes" covers four products commercially distinguished, namely, (1) Potash or black salts, or black flux, which is the unrefined potassium carbonate produced by calcining stone ash, argols, or wine lees; (2) pearlash, or white flux, which is refined potassium carbonate; (3) stone ash, known also as crude potash or lump potash, which is a mixture of potassium carbonate, potassium hydroxide, and potassium sulphate with various organic and inorganic matter; and (4) potassium hydroxide, or caustic potash. There is included in Table 17 such of these potashes as were reported.

Table 27 shows statistics of all establishments manufacturing potashes for each census from 1849 to 1909, inclusive, such establishments being assigned to the chemical industry.

CENSUS.	PRODUCTION OF POTASHES IN THE CHEMICAL INDUSTRY.		
	Number of establishments reporting.	Quantity (pounds).	Value.
1909.....	31	1,866,570	\$38,940
1904.....	39	1,811,037	104,655
1899.....	67	3,864,766	178,180
1889.....	75	5,106,939	197,507
1879.....	68	4,571,671	232,643
1869.....	105	(¹)	327,671
1859.....	212	(¹)	538,550
1849.....	569	(¹)	1,401,533

¹ Not reported.

There was a steady decrease in the value of potash products from 1849 to 1909. Statistics as to quantity of output were not obtained until the census of 1879. From 1879 to 1904 the output decreased, but between 1904 and 1909 it increased slightly.

Of the total quantity of potashes reported for 1909, 1,049,102 pounds, valued at \$53,319, were reported from Michigan.

The product shown in the table for 1909 includes the solid and liquid potash produced electrolytically by one establishment in New York.

Group IV—Alums.—The group of alums comprises alum cake, or crude aluminum sulphate; concentrated alum, or crystallized aluminum sulphate; potash, ammonia, and soda alums and all other double sulphates of aluminum with alkali metals or their isomorphs, such as chrome alum; burnt alum; porous alum, which is effloresced soda alum in various degrees of purity; alumino-ferric cake, or alum cake containing a considerable amount of iron; and aluminum hydrate or hydroxide.

In addition to the production, as shown in Table 19, for 1909 (113,422 tons), there was a large production by establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids and of paint and varnish. Table 28 shows statistics for all establishments producing alums in 1909, 1904, and 1899, including that consumed in the establishments where produced in 1909 and 1899.

Table 28	TOTAL PRODUCTION OF ALUMS—ALL INDUSTRIES.								
	1909			1904			1899		
	Quantity (tons)	Value	Per cent of increase. ¹	Quantity (tons)	Value	Per cent of increase. ¹	Quantity (tons)	Value	Per cent of increase. ¹
Total quantity (tons) ...	139,917	\$3,022,355	51.6	112,772	\$2,956,844	24.1	92,323	\$2,446,576	21.1
For sale:									
Quantity (tons).....	138,147	112,772	54.0	89,734	23.5	22.5	25.7		
Value.....	\$3,022,355	\$2,956,844	23.5	\$2,446,576	2.2	20.9			
Consumed in establishments where produced (tons)	1,770	(*)	-31.6	2,589					

¹ A minus sign (—) denotes decrease.

² Figures not available.

The quantity of alums consumed in the establishments where produced was not reported in 1904, and it is probable that such alums were not in all cases reported for 1909. Table 29 shows the quantity and value of the several kinds of alum produced for sale in 1909, 1904, and 1899.

Table 29	TOTAL PRODUCTION OF ALUMS—ALL INDUSTRIES.					
	1909		1904		1899	
	Quantity (tons)	Value	Quantity (tons)	Value	Quantity (tons)	Value
Total	138,147	\$3,022,355	112,772	\$2,956,844	89,734	\$2,446,576
Alum cake.....	13,501	274,307	8,748	161,906	2,024	54,047
Burnt alum.....	5,873	209,904	7,929	384,328	3,315	174,600
Concentrated alum.....	27,439	468,795	40,460	972,892	51,508	1,062,547
Potash alum.....	5,127	155,319	5,154	156,448	7,100	215,004
Soda alum.....	359	14,360	41	4,923	4,700	228,500
Other alums.....	85,848	1,899,670	49,440	1,296,347	21,087	731,878

It seems probable that the statistics for the products shown separately in the table may not in all cases represent the total output of the specified product, as some establishments making these products may not have reported them separately but included them under "other alums." Some manufacturers, moreover, do not consider soda alum, which is known in the

trade as "C. T. S.," or cream of tartar substitute, as an alum, and hence may have reported it under Group XII (chemicals, not elsewhere specified). As the extent to which the different products were reported under other headings may have varied at different censuses, the figures for the different years may not be entirely comparable. Of the products shown separately in the table, concentrated alum was the most important in 1909, both in quantity and in value of output, alum cake coming next.

The 85,848 tons of "other alums" shown for 1909 include 50,298 tons of aluminum sulphate, valued at \$843,956; 11,758 tons of porous alum, valued at \$471,378; 3,672 tons of sodic aluminum sulphate, valued at \$119,581; 950 tons of aluminum hydroxide, valued at \$46,917; and 19,170 tons of unspecified kinds of alum, valued at \$417,838.

Table 30 shows, by states, for 1909, 1904, and 1899, the total value of the alums produced for sale both in the chemical and in other industries.

Table 30	TOTAL VALUE OF ALUMS MANUFACTURED—ALL INDUSTRIES.		
	1909	1904	1899
United States	\$3,022,355	\$2,956,844	\$2,446,576
Massachusetts.....	(1)	270,614	306,754
Illinois.....	440,976	481,754	(1)
New York.....	646,437	(1)	(1)
Pennsylvania.....	1,390,589	1,479,340	1,411,652
All other states ²	544,353	725,136	728,170

¹ Included with "all other states."

² Includes, for 1909, Massachusetts, Michigan, Nebraska, and New Jersey; for 1904, California, Michigan, New York, and Ohio; for 1899, Illinois, New York, and Michigan.

Pennsylvania is the leading state in the production of alums, reporting 46 per cent of the total value for 1909, as compared with 50 per cent in 1904, and 57.7 per cent in 1899; the alum output of the state, however, shows a decrease of 6 per cent in value between 1904 and 1909.

Table 31 shows, by states, the number of establishments manufacturing alums in 1909, 1904, and 1899.

Table 31	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING ALUMS.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING ALUMS.		
	STATE.				1909	1904	1899
	1909	1904	1899				
United States	19	17	13	Nebraska.....	1	.....
California.....	1	1	.....	New Jersey.....	1	.....
Illinois.....	2	3	1	New York.....	4	2	
Massachusetts.....	2	3	3	Ohio.....	1	.....
Michigan.....	2	1	1	Pennsylvania.....	7	6	

Group V—Coal-tar products.—Coal tar is produced in the destructive distillation of bituminous coal, and is, therefore, a by-product of the coal-gas industry and of the coke industry when by-product ovens are used. The products obtained from it are reported under two heads: (1) The direct products of the distillation of coal-tar sold as such, which include pitch, creosote oil, dead oil, and other tar oils, benzol (benzene), toluol, xylol, naphthalene, anthracene, and other coal-tar hydrocarbons, phenol (carbolic acid), cresol, naphthol,

resorcin, or resorcinol, and other coal-tar tertiary alcohols, and aniline, toluidine, xylydine, and other coal-tar amines; and (2) chemicals made from coal-tar distillery products, which include the aldehydes, acids, ketones, salts, and various other so-called benzene derivatives. The latter cover the coal-tar dyes, which are also produced by establishments assigned to the classification "dyestuffs and extracts," and many nitro-substitution compounds and synthetic preparations which are also made by establishments assigned to the classification "oil, essential," and also a number of substances, such as are included under the heading of "fine chemicals" in Table 17. Many establishments distilling coal tar consume part of the product in the manufacture of roofing felt, roofing paper, and roofing preparations or paints, and hence are classified as engaged in other industries. On account of the great diversity existing in the kind and the value of the products, only the total value is given.

Table 32 shows, by states, for 1909, 1904, and 1899, the total value of the coal-tar products reported by all establishments, whether in the chemical industry or in other industries.

STATE.	TOTAL VALUE OF COAL-TAR PRODUCTS—ALL INDUSTRIES.		
	1909	1904	1899
United States	\$4,286,119	\$3,984,821	\$1,421,720
Massachusetts.....	526,025	175,978	(1)
Missouri.....	183,473	284,637	415,600
New York.....	262,299	926,329	44,016
Ohio.....	607,514	463,001	(1)
Pennsylvania.....	783,382	375,757	396,759
All other states ²	1,923,426	1,759,119	565,345

¹ Included in "all other states."
² Includes for 1909: Alabama, Illinois, Kentucky, Louisiana, Michigan, Minnesota, Nebraska, New Jersey, Tennessee, and Wisconsin; for 1904: California, Illinois, Maine, Michigan, New Jersey, Rhode Island, and Tennessee; and for 1899: California, Louisiana, Massachusetts, Minnesota, New Jersey, Ohio, and Tennessee.

The total value of coal-tar products increased from \$1,421,720 to \$4,286,119, or 201.5 per cent, during the decade. Of the states shown separately in the table, Pennsylvania leads, followed by Ohio and Massachusetts. New Jersey and Illinois, which are included under "all other states," were also important states in the manufacture of coal-tar products in 1909. The value of the coal-tar products reported from New York shows a considerable decrease, amounting to 71.7 per cent for the five-year period 1904-1909. Missouri also shows a decrease from 1904 to 1909. Massachusetts, Pennsylvania, and Ohio, on the other hand, show considerable increases.

Table 33 shows, by states, the total number of establishments reporting coal-tar products in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING COAL-TAR PRODUCTS.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING COAL-TAR PRODUCTS.		
	1909	1904	1899		1909	1904	1899
United States ..	42	39	22	Minnesota.....	2	.....	1
Alabama.....	1	.....	.....	Missouri.....	3	3	3
California and Maine.....	.....	4	1	Nebraska.....	1	.....	.....
Connecticut.....	1	.....	.....	New Jersey.....	3	8	2
District of Columbia.....	1	.....	.....	New York.....	5	8	3
Georgia.....	1	.....	.....	Ohio.....	3	3	2
Illinois.....	1	1	.....	Pennsylvania.....	7	6	6
Indiana.....	1	.....	.....	Rhode Island.....	1	1	.....
Kentucky.....	2	.....	.....	Tennessee.....	1	1	1
Louisiana.....	1	.....	1	Washington.....	1	.....	.....
Massachusetts.....	3	3	2	Wisconsin.....	1	.....	.....
Michigan.....	2	1	.....			

Group VI—Cyanides.—The cyanides reported for 1909 comprise sodium cyanide, yellow prussiate of potash (prussiate of soda), and potassium cyanide. Only the production of yellow prussiate of potash, however, can be given separately, 3,510,208 pounds of this product, valued at \$463,983, being reported for 1909.

Table 34 shows the quantity and value of cyanides produced by establishments in all industries in 1909, 1904, and 1899.

	TOTAL PRODUCTION OF CYANIDES—ALL INDUSTRIES.					
	1909	1904	1899	Per cent of increase.		
				1899-1909	1904-1909	1899-1904
Total quantity (pounds).....	13,291,080	11,196,318	8,460,989	57.1	18.7	32.3
Value.....	\$1,941,893	\$1,710,823	\$1,595,505	21.7	13.5	7.2

In 1909 the entire production was reported by establishments assigned to the chemical industry, as defined by the Bureau of the Census, but in 1904 cyanides to the value of \$531,719, and in 1899 cyanides to the value of \$10,582, were produced as secondary products by establishments in other industries, these amounts being included in the above table.

Table 35 shows, by states, the total number of establishments manufacturing cyanides in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING CYANIDES.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING CYANIDES.		
	1909	1904	1899		1909	1904	1899
United States ..	7	11	18	Ohio.....	2	2	3
Massachusetts.....	1	1	1	Pennsylvania.....	2	3	4
New Jersey.....	1	1	6	Maryland, Michigan, and Missouri.....	.....	2	4
New York.....	1	2	.....			

Group VII—Bleaching materials.—This group of products includes chlorine, chloride of lime (bleaching powder), chloride of soda and other hypochlorites, hydrogen dioxide (peroxide), sodium, magnesium, calcium, barium, and other dioxides (peroxides), sulphur dioxide or sulphurous acid, sulphites, and sodium, potassium, calcium, and other bisulphites. Many of these substances are now manufactured by the aid of electricity, and the products made in this manner are included in Group VIII (chemicals produced by the aid of electricity) in Tables 17 and 19.

Table 36 gives statistics of the bleaching materials reported as made in 1909, 1904, and 1899 by all establishments, whether in the chemical industry or in other industries. Bleaching materials manufactured by the aid of electricity are included.

PRODUCT.	1909	1904	1899	Per cent of increase.		
				1899-1909	1904-1909	1899-1904
Total value	\$3,208,354	\$1,158,064	\$592,658	441.0	176.9	85.4
Hypochlorites: ¹						
Quantity (tons).....	58,401	19,588	10,979	431.9	198.1	78.4
Value.....	\$1,786,846	\$535,835	\$462,949	286.0	233.5	15.7
Hydrogen peroxide:						
Quantity (tons).....	4,963	2,185	294	1,588.1	127.1	643.2
Value.....	\$870,541	\$413,221	\$63,754	1,265.5	110.7	548.1
Bisulphites:						
Quantity (tons).....	16,059	6,223	1,461	999.2	158.1	325.9
Value.....	\$226,154	\$110,155	\$34,486	555.8	105.3	219.4
Other bleaching agents ¹ .	\$322,813	\$98,853	\$31,469	925.8	226.6	214.1

¹ Includes electrolytic products.

Hypochlorites constitute the most important class of bleaching materials manufactured, contributing 55.7 per cent of the total value of this class of products in 1909, while hydrogen peroxide ranks next. Under "other bleaching agents" are included liquid chlorine, sulphur dioxide, sodium bisulphate, aluminum chloride, and other agents not specified. There was a marked increase during the decade 1899-1909 in the manufacture of each class of bleaching materials, the output of hydrogen peroxide being nearly seventeen times as great in 1909 as in 1899, and that of bisulphites nearly eleven times as great.

Table 37 shows, by states, the total value of bleaching materials manufactured in 1909, 1904, and 1899.

STATE.	TOTAL VALUE OF BLEACHING MATERIALS—ALL INDUSTRIES.		
	1909	1904	1899
United States	\$3,208,354	\$1,112,536	\$587,891
Massachusetts.....	217,492	41,746	.....
Michigan.....	3576,408	(¹)	(²)
New Jersey.....	75,941	46,595	39,171
New York.....	2,045,833	799,521	407,327
All other states.....	290,620	224,676	141,493

¹ In addition, sulphur dioxide, valued at \$45,526, was consumed in the establishment where produced.

² In addition, sulphur dioxide, valued at \$4,667, was consumed in the establishment where produced.

³ Includes electrolytic products.

⁴ Included in "all other states."

New York reported nearly two-thirds of the value of the bleaching materials manufactured in 1909, and a little over two-thirds of the value in 1904 and 1899. The value of the bleaching materials manufactured in New York, the greater part of which consists of hypochlorites made by the electrolytic process, was more than five times as great in 1909 as in 1899.

Table 38 shows the total number of establishments manufacturing bleaching materials in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING BLEACHING MATERIALS.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING BLEACHING MATERIALS.		
	1909	1904	1899		1909	1904	1899
United States ..	47	33	26	Michigan.....	4	2	1
California.....	1	.....	.....	Missouri.....	2	2	2
Georgia.....	1	.....	.....	New Jersey.....	4	3	3
Indiana.....	1	.....	.....	New York.....	17	11	10
Illinois.....	3	.....	3	Ohio.....	2	3	1
Maryland.....	2	1	.....	Pennsylvania.....	2	7	6
Massachusetts.....	8	4	.....			

Group VIII—Chemicals produced by the aid of electricity.—The segregation of chemicals produced by the aid of electricity under a separate classification was made for the first time in the report on chemicals and allied products for the census of 1899. This branch of the chemical industry shows a rapid increase both in range of products and in their quantity and value. Many of the products are, or have until recently, been made under the protection of patents, the manufacture of a particular product being confined to one or two establishments; consequently detailed statistics of production can not be given for some of the most important products. The group includes some substances which are also made by other chemical processes, as, for example, caustic soda and hypochlorites, but only products produced by the aid of electricity are included in this group.

Table 39 shows the total production of chemicals produced by the aid of electricity in 1909, including that of establishments in other industries. The caustic soda product has also been included in the total production of sodas, as shown in Table 25, and the hypochlorites in the total production of bleaching materials, as shown in Table 36. As already explained, it is possible to give the output of only a few products without disclosing the operations of individual concerns.

The class "metals and alloys" includes aluminum, silicon, ferrovandium, ferrosilicon, ferrotitanium, cuprovanadium, and other metals and alloys. Elements and compounds produced by the aid of electricity specifically reported and included under the heading of "all other" are phosphorus, sodium, aluminum, lead oxides, liquid chlorine, carbon disulphide, sodium carbonate, potash, and potassium bromide.

The most important class of products produced by the aid of electricity shown in the table, as measured

by value, is that comprising metals and alloys, which contributed 41.5 per cent of the total value of chemicals produced by the aid of electricity in 1909.

Table 39

PRODUCT.	TOTAL PRODUCTION OF CHEMICALS PRODUCED BY THE AID OF ELECTRICITY—ALL INDUSTRIES.		
	Number of establishments reporting.	Quantity (tons).	Value.
Total	34		\$18,451,461
Calcium carbide.....	4	60,973	2,984,001
Caustic soda ¹	5	19,428	1,032,647
Chlorates.....	5	5,785	904,550
Hypochlorites ²	5	45,976	1,506,831
Metals and alloys.....	9		7,653,984
Abrasives and electrodes.....	4		1,415,799
All other.....	11		2,953,649

¹ See Table 25 for total production of caustic soda, including that made in electrochemical establishments.

² See Table 36 for total production of hypochlorites, including those made in electrochemical establishments.

Table 40 shows, by geographic divisions, the value of products produced by the aid of electricity, for 1909, 1904, and 1899.

Table 40

DIVISION.	TOTAL VALUE OF CHEMICALS PRODUCED BY THE AID OF ELECTRICITY—ALL INDUSTRIES.		
	1909	1904	1899
United States	\$18,451,461	\$7,068,246	\$2,045,535
North Atlantic.....	14,445,668	6,037,533	1,852,279
North Central.....	3,453,462	827,583	193,256
All other divisions.....	552,331	203,130	
Per cent of total	100.0	100.0	100.0
North Atlantic.....	78.3	85.4	90.6
North Central.....	18.7	11.7	9.4
All other divisions.....	3.0	2.9	

The value of all products produced by the aid of electricity in 1909 by all establishments, including those manufacturing them as secondary products, was \$18,451,461, as compared with \$7,068,246 in 1904 and \$2,045,535 in 1899, an increase of 802 per cent for the decade, the increase for the five-year period 1899–1904, amounting to 245.5 per cent, and that for the five-year period 1904–1909 to 161 per cent.

Niagara Falls, N. Y., is the chief seat of the electrochemical industry, and it has held this position from the beginning, several large manufacturing establishments there employing electricity generated by the water power of the falls in the manufacture of chemical substances. The North Atlantic states reported 90.6 per cent of the total value of products produced by the aid of electricity in 1899 and 78.3 per cent in 1909. Of the total value of products produced by the aid of electricity in 1909, New York reported \$13,401,878, or 72.6 per cent; Michigan, \$1,513,198, or 8.2 per cent; Pennsylvania, \$903,196, or 4.9 per cent; and all other states, \$2,633,189, or 14.3 per cent.

Table 41 shows, by states, the number of establishments manufacturing products by the aid of electricity in 1909, 1904, and 1899.

Table 41

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING PRODUCTS BY THE AID OF ELECTRICITY.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING PRODUCTS BY THE AID OF ELECTRICITY.		
	1909	1904	1899		1909	1904	1899
United States	34	21	14	New York.....	18	14	10
Illinois.....	1			Pennsylvania.....	3		
Maine.....	1	1	1	Virginia.....	1	1	
Maryland.....	1			West Virginia.....	1	1	
Michigan.....	5	4	1	Connecticut.....			1
Minnesota.....	1			New Hampshire.....			1
New Jersey.....	2						

Group IX—Plastics.—This group embraces pyroxylin plastics (including those sold under such trade names as celluloid, xylonite, fiberloid, viscoloid, pegamoid, pyrolin, etc.), pyroxylin or soluble cotton, viscose, rubber substitutes, and all plastics formed by using caoutchouc, gutta-percha, casein, fibrin, gluten, gums, and glue, or other cementing material by which sawdust, wood pulp, bone dust, zinc oxide, antimony sulphide, kaolin, and other fillers are held in solid aggregations which may be molded or shaped. The value of the products reported under this head includes the value of finished goods manufactured from plastics in the establishments producing the plastic material. Table 42 shows the value of the production of plastics by establishments in all industries in 1909, 1904, and 1899.

Table 42

CLASS.	TOTAL VALUE OF PLASTICS PRODUCED IN ALL INDUSTRIES.		
	1909	1904	1899
Total value	\$7,472,732	¹ \$3,849,124	² \$3,191,330
Pyroxylin plastics.....	5,682,379	2,136,976	1,526,572
Other plastics.....	1,790,353	1,812,148	1,664,758

¹ In addition, plastics valued at \$3,244,553 were consumed in the establishments where produced.

² In addition, plastics valued at \$2,009,185 were consumed in the establishments where produced.

The comparability of the returns for the different censuses may possibly be affected by variations in the extent to which manufactures of plastics were included; moreover, it is probable that some manufactured pyroxylin goods are included under "other plastics." The value of plastics, as reported, increased from \$3,191,330 in 1899 to \$7,472,732 in 1909, or 134.2 per cent, the relative increase being higher for the last half of the decade than for the first. Pyroxylin plastics are by far the most important class, contributing 76 per cent of the total in 1909. Of the total value reported for plastics in 1909, New Jersey contributed \$4,634,200, or 62 per cent; Massachusetts, \$2,127,742, or 28.5 per cent; New York, \$556,005, or 7.4 per cent; and all other states, \$154,785, or 2.1 per cent.

Table 43 shows, by states, the total number of establishments manufacturing plastics in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING PLASTICS.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING PLASTICS.		
	1909	1904	1899		1909	1904	1899
United States...	24	14	13				
California.....	1			Massachusetts.....	5	3	1
Connecticut.....	1	1		Michigan.....	3		
Florida.....	1			New Jersey.....	6	8	11
Illinois.....	1			New York.....	6	2	1

Group X—Compressed and liquefied gases.—This group of products embraces all gases that are compressed or liquefied for sale, with the exception of illuminating gases (acetylene and pintsch gas), the production of which is included under the gas industry. The gases of commerce which are handled in compressed form in considerable quantities are anhydrous ammonia, carbon dioxide (carbonic acid gas, CO₂), chlorine, oxygen, and laughing gas (nitrous oxide, N₂O). Others of minor importance are hydrogen, liquid air, and sulphur dioxide (sulphurous acid gas, SO₂). Table 44 shows statistics of the total production of these gases by establishments in all industries for 1909, 1904, and 1899.

PRODUCT.	TOTAL PRODUCTION OF COMPRESSED AND LIQUEFIED GASES—ALL INDUSTRIES.					
	1909	1904	1899	Per cent of increase.		
				1899-1909	1904-1909	1899-1904
Total value.....	\$5,571,820	\$2,761,359	\$1,230,797	352.0	99.3	128.8
Anhydrous ammonia:						
Quantity (pounds)...	16,840,860	5,752,233	2,443,729	589.1	192.8	135.4
Value.....	\$2,992,693	\$1,176,854	\$438,157	583.0	154.3	168.6
Carbon dioxide (carbonic acid gas):						
Quantity (pounds)...	47,953,291	35,991,627	12,084,281	296.8	33.2	197.8
Value.....	\$2,345,743	\$1,343,966	\$719,364	226.1	74.5	86.8
Laughing gas (nitrous oxide):						
Quantity (pounds)...	97,175	41,020	(1)		136.9	
Value.....	\$38,589	\$28,311	(1)		36.3	
Oxygen:						
Quantity (cubic feet)...	3,814,000	(2)	(2)			
Value.....	\$177,469	\$69,246	\$38,170	364.9	156.3	81.4
All other gases.....	\$17,326	\$172,982	\$35,106			

¹ Included in "all other gases."

² Comparable figures not available.

The growth in the production of compressed gases has been rapid, the value of all products of this group increasing during the decade from \$1,230,797 to \$5,571,820, or 352.7 per cent. This growth is chiefly due to the increasing amounts of anhydrous ammonia consumed in ice manufacture and refrigeration and of carbon dioxide consumed by the soda-fountain trade. The value of these two products represented 96 per cent of the total value of this class of products in 1909, that of anhydrous ammonia alone representing 53.8 per cent.

The anhydrous ammonia product for 1909 includes 4,871,014 pounds, valued at \$448,455, reported by establishments engaged in the coke industry, where it is a product of the retort or by-product ovens. The

value of compressed and liquefied gases, as shown in the table, does not include the value of the containers in which the gases are shipped to the consumers. These are returned to the factory, and the freight on the containers from and to the factory constitutes a considerable part of the cost of these products to the consumer.

The oxygen reported includes medicated oxygen, but the bulk of the product was straight oxygen; oxygen manufactured for use in the production of calcium lights is also included. Some establishments reported the quantity of oxygen in gallons, following the trade practice of former years, though most of the larger producers now use the cubic foot at atmospheric pressure as the unit of quantity; where the quantity was reported in gallons it was reduced to cubic feet on the basis of 7.5 gallons to 1 cubic foot.

Table 45 shows, by states, the total number of establishments manufacturing compressed and liquefied gases in 1909, 1904, and 1899, and the number manufacturing anhydrous ammonia and carbon dioxide in 1909. The manufacture of laughing gas was reported by 5 establishments in 1909 and oxygen by 20.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING COMPRESSED AND LIQUEFIED GASES.				
	1909			1904	1899
	Total for all gases.	Anhydrous ammonia.	Carbon dioxide.		
United States.....	76	21	34	56	37
California.....	5	1	4	5	2
Colorado.....	1	1	1	1	
Connecticut.....	1				
Delaware.....					1
Georgia.....	2		2	2	
Illinois.....	7	2	4	3	3
Louisiana.....	1		1	1	
Massachusetts.....	9	1	1	3	2
Michigan.....					1
Minnesota.....	4	1	2	3	
Missouri.....	5	2	3	4	2
New Jersey.....	7	5	2	6	7
New York.....	15	2	5	14	9
Ohio.....	4	1	3	3	3
Pennsylvania.....	9	4	3	7	5
Tennessee.....	1				
Texas.....	1		1	1	
Vermont.....	1				1
Virginia.....	1		1	1	
Washington.....	1	1			
Wisconsin.....	1		1	2	1

Group XI—Fine chemicals.—This group of products embraces chemicals sold in the trade as chemically or absolutely pure; the chemicals which are more especially made use of in analytical operations, in scientific research, and in pharmacy; and chemicals like the salts of gold, of silver, and of platinum, for which the value per unit is high. Among the chemicals which are embraced here may be named chemically pure or "analyzed" acids, bases, and salts; acetone and other ketones; absolute alcohols and all alcohols other than commercial grain and wood alcohols; aldehydes, such as vanillin; alkaloids; elementary substances other than common and low-priced ones; enzymes, ferments, or diastases, such as pancreatin, pepsin, rennet, trypsin, lactose, sucrose, and zymose; esters

(ethereal salts or compound ethers); refined and artificial camphor; chloroform; and ethers, simple and mixed; rare earth compounds, such as the salts of cerium, lanthanum, thorium, radium, and uranium; terpenes; toxins and antitoxins; and urea and the ureides.

Table 46 shows the quantity and value of fine chemicals produced by establishments in all industries in 1909, 1904, and 1899, so far as they can be shown in detail.

PRODUCT.	TOTAL PRODUCTION OF FINE CHEMICALS— ALL INDUSTRIES.		
	1909	1904	1899
Total value	\$11,532,086	\$9,640,073	.....
Alkaloids:			
Quantity (ounces).....	3,482,617	5,797,925	4,054,478
Value.....	\$3,188,914	\$3,229,527	\$1,750,503
Gold salts:			
Quantity (ounces).....	42,544	47,641	12,347
Value.....	\$430,944	\$453,202	\$120,696
Silver salts:			
Quantity (ounces).....	2,030,399	1,899,081	1,606,108
Value.....	\$727,428	\$778,439	\$627,252
Platinum salts:			
Quantity (ounces).....	1,561	19,068	8,112
Value.....	\$19,123	\$175,682	\$61,400
Refined camphor:			
Quantity (pounds).....	1,821,030	¹ 1,166,372	² 598,708
Value.....	\$431,616	\$722,907	\$254,190
Chloroform:			
Quantity (pounds).....	1,869,685	616,670	(³)
Value.....	\$477,538	\$165,604	(³)
Ether:			
Quantity (pounds).....	⁴ 1,177,914	⁵ 854,411	⁶ 263,238
Value.....	\$199,448	\$427,401	\$129,876
Acetone:			
Quantity (pounds).....	8,935,446	⁷ 1,300,395	1,638,715
Value.....	\$930,182	\$161,320	\$178,666
All other.....	\$5,126,893	\$3,525,991	(³)

¹ Not including camphor consumed in the establishment where refined, which quantity exceeds that made for sale.
² Includes artificial camphor.
³ Figures not available.
⁴ In addition, 2,084,792 pounds were consumed in the establishments where produced.
⁵ In addition, 3,384,763 pounds were consumed in the establishment where produced.
⁶ In addition, 1,222,704 pounds were consumed in the establishment where produced.
⁷ In addition, 288,820 pounds were consumed in the establishment where produced.

Alkaloids are the most important class of fine chemicals shown separately, contributing 27.7 per cent of the total value in 1909, while acetone ranked next. The production of alkaloids, however, decreased considerably during the five-year period 1904-1909, being less in 1909 than in 1899, although the value was nearly twice as great. There was also a marked decrease in the production of platinum salts, but chloroform, ether, and acetone show striking increases in output. The decrease in the average unit value of ether as reported, from 50 cents per pound in 1904 to 16 cents per pound in 1909, is chiefly due to the remission of the internal-revenue tax on alcohol used in chemical manufacture. Ether is largely, if not wholly, made from alcohol and the tax of \$1.10 per proof gallon is theoretically equal to 36.7 cents per pound of ether.

The large proportion of the total value of this group of products included under the heading of "all other" suggests the possibility that a part of the output of some of the products shown specifically in the table

may have been reported under this head and consequently that the statistics given do not show the total production of some of these substances. Among the numerous products included under the heading of "all other" for 1909 which were specifically reported were 43,660 pounds of thorium compounds, valued at \$131,151; 1,470,568 pounds of amyl acetate, valued at \$442,771; and 8,171 pounds of ethyl chloride, valued at \$37,142.

Table 47 shows, by states, the total number of establishments manufacturing fine chemicals in 1909, 1904, and 1899.

STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING FINE CHEMICALS.			STATE.	TOTAL NUMBER OF ESTABLISHMENTS MANUFACTURING FINE CHEMICALS.		
	1909	1904	1899		1909	1904	1899
United States	63	67	49	New Jersey.....	21	23	15
Colorado.....	1	1	1	New York.....	11	14	7
Connecticut.....	1	.....	.....	Ohio.....	8	3	2
Kentucky.....	1	.....	.....	Pennsylvania.....	7	11	13
Louisiana.....	1	.....	.....	Rhode Island.....	1	1	1
Massachusetts.....	4	2	1	Wisconsin.....	1	1	.....
Michigan.....	3	3	1	All other states.....	.....	4	6
Missouri.....	3	4	2				

Group XII—Chemicals, not elsewhere specified.—This class embraces all chemicals the production of which is covered by the chemical industry as defined by the Bureau of the Census and which are not included in the groups previously considered. Table 48 presents statistics of the total production by establishments in all industries of such of these chemicals as were reported separately.

PRODUCT.	TOTAL PRODUCTION OF CHEMICALS NOT ELSEWHERE SPECIFIED— ALL INDUSTRIES.		
	1909	1904	1899
Total value	\$44,882,608	.....	.....
Glycerin:			
Quantity (pounds).....	1,81,885,536	46,972,658	26,512,454
Value.....	\$11,752,562	\$5,355,520	\$3,096,601
Cream of tartar:			
Quantity (pounds).....	15,592,937	15,650,000	10,981,680
Value.....	\$2,925,883	\$2,892,563	\$2,117,704
Epsom salts:			
Quantity (pounds).....	21,621,297	20,566,443	9,239,809
Value.....	\$189,791	\$215,088	\$75,066
Blue vitriol:			
Quantity (pounds).....	36,546,543	(²)	(²)
Value.....	\$1,531,574	(²)	(²)
Copperas:			
Quantity (pounds).....	25,637,092	9,700,104	27,595,909
Value.....	\$78,467	\$28,096	\$199,869
Phosphate of soda:			
Quantity (pounds).....	24,580,159	9,659,519	4,679,160
Value.....	\$540,282	\$244,373	\$155,989
Tin compounds:			
Quantity (pounds).....	10,293,377	11,621,378	6,259,794
Value.....	\$1,535,350	\$1,361,299	\$603,937
Zinc salts:			
Quantity (pounds).....	25,054,213	11,679,546	9,511,909
Value.....	\$472,302	\$201,771	\$353,900
All other chemicals.....	\$20,699,716	(²)	(²)
By-products and residues.....	\$5,156,681	.....	.....

¹ In addition, there were 5,633,197 pounds with no value and 5,879,279 pounds used in establishments where produced.
² Figures not available.

Glycerin is the most important of the products shown separately in Table 48. Of the total production of glycerin shown in the table, which repre-

sents the output of establishments manufacturing chemicals either as chief or as secondary products, a large part was produced as a secondary product in the manufacture of soap. It was not manifest, in all cases, whether the product was refined or crude, and there is duplication in the figures representing the amount of the output to the extent that crude glycerin, the product of some establishments, was bought and refined by others, but the amount of this duplication can not be definitely ascertained.

Table 49 presents, by states, detailed statistics as to the glycerin produced in 1909. The total production, including that reported as of no value at the works, is given in order to show the total available supply in the United States.

STATE.	Total quantity (pounds).	Reported with value.		Of no value at works (pounds).	Pro-duced and con-sumed (pounds).
		Quantity (pounds).	Value.		
United States	93,398,012	81,885,536	\$11,752,562	5,633,197	5,879,279
California	1,045,846	749,685	61,331	271,541	24,620
Illinois	15,671,677	13,767,008	1,858,329	514,684	1,389,985
Massachusetts	1,467,147	1,143,760	144,112	.....	323,387
Missouri	3,424,779	1,997,790	188,734	22,880	1,404,109
New Jersey	5,711,398	4,947,695	653,295	713,380	50,323
New York	28,829,614	27,785,268	3,979,485	1,044,346	.....
Ohio	18,722,210	17,185,148	2,891,709	966,372	570,690
Pennsylvania	2,646,169	1,967,823	256,460	545,307	133,039
All other states	15,879,172	12,341,359	1,719,107	1,554,687	1,983,126

Of the total production of glycerin in industries other than the soap industry (35,009,894 pounds), 31,725,366 pounds were reported as refined glycerin, and 923,296 pounds were reported as crude glycerin. The returns did not state whether the remaining 2,361,232 pounds were crude or refined. Soap factories reported the value for 46,896,021 pounds, with a total value of \$6,790,264, the average value per pound (\$.14) indicating that it was chiefly refined glycerin. Although as stated the duplication due to the purchase of crude glycerin for refining can not be definitely determined, yet the quantity was considerable, amounting to at least 20,000,000 pounds. Allowing for this duplication, the production of marketable glycerin in 1909 (not including that used in the establishments where made) was approximately 60,000,000 pounds.

New York was the leading state in the production of glycerin in 1909, reporting 30.9 per cent of the total output, while Ohio and Illinois ranked second and third, respectively, these three states together contributing 67.7 per cent of the total.

California and New York were the only states reporting the manufacture of cream of tartar.

Maryland, Ohio, and Georgia, in the order named, were the leading states in respect to the manufacture of Epsom salts. Blue vitriol is chiefly a by-product of copper refining, and all but a small part of the production was reported by establishments in the copper and lead smelting and refining industries located in New York, New Jersey, Nebraska, California, and Illinois.

More than four-fifths of the copperas was produced in Pennsylvania, though considerable amounts were also reported from California and Indiana.

The phosphate of soda reported was the product of 10 establishments located in New Jersey, Maryland, Missouri, New York, Pennsylvania, Connecticut, and Massachusetts, named in order of output.

The chief states in the manufacture of tin compounds were New Jersey, Pennsylvania, Ohio, and Massachusetts, and the leading states in the production of zinc salts were Indiana, Ohio, and Illinois.

Table 50 gives the reported quantities and values of such of the chief products included under the heading of "all other chemicals" in Table 48 as can be shown without disclosing individual operations.

PRODUCT.	Quantity.		Value.
	Unit.	Amount.	
	Aqua ammonia	Pounds	20,983,476	$839,820
Blanc fixe	Tons	4,076	86,986
Calcium chloride	Tons	8,475	70,933
Formaldehyde	Pounds	3,794,486	363,717
Glauber's salt	Tons	46,471	512,464
Oxide of zinc	Tons	12,360	953,467
Refined sulphur	Tons	25,269	891,501
Silicate of soda	Tons	34,170	366,621
Sugar of milk	Pounds	¹ 7,099,992	637,503
Sulphides of soda	Tons	7,673	206,450

¹ In addition, approximately 2,000,000 pounds were reported by establishments in the butter, cheese, and condensed milk industry.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the chemical industry are presented, by states, in Tables 51 and 52.

Table 51 shows for 1909, 1904, and 1899 the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 52 gives more detailed statistics for the industry for 1909 only.

CHEMICALS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

Table 51 STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1909	349	27,791	154	3,923	23,714	208,804	\$155,144	\$8,137	\$14,085	\$84,122	\$117,698	\$53,567
	1904	276	22,707	123	2,773	19,808	132,262	98,621	4,048	10,790	42,063	75,222	33,159
	1899	1,433			2,123	19,020	90,349	89,089	2,923	9,393	34,548	62,637	28,081
California.....	1909	13	294	2	48	244	1,308	2,788	66	168	762	1,306	544
	1904	15	303	3	41	259	1,080	1,969	44	189	700	1,124	424
	1899	21	463	11	62	390	984	1,845	70	230	1,406	2,061	655
Georgia.....	1909	4	75	2	20	53	200	379	29	24	60	246	186
	1904	3	50	3	17	30	109	292	21	12	41	133	92
Illinois.....	1909	19	972	2	134	836	5,907	4,639	181	531	2,896	4,656	1,760
	1904	14	846	2	123	721	2,874	4,280	186	392	1,355	2,283	928
	1899	26	688	13	96	579	1,461	2,384	119	309	1,176	2,086	910
Louisiana.....	1909	4	52	1	15	36	159	337	18	21	172	249	77
	1904	3	13	1	2	10	85	41	1	6	11	29	18
Maryland.....	1909	3	316		31	285	1,855	1,676	37	158	684	1,313	629
	1904	3	366	2	41	323	625	1,628	52	141	589	1,082	493
	1899	7	511	3	33	475	455	1,806	51	246	782	1,271	489
Massachusetts.....	1909	24	1,604	9	237	1,358	3,781	5,185	385	811	3,048	5,916	2,868
	1904	14	969	3	106	860	3,281	2,652	188	504	1,514	3,509	1,995
	1899	17	722	8	92	622	2,169	1,877	133	339	1,081	2,011	930
Michigan.....	1909	36	3,512	25	313	3,174	26,594	20,015	560	2,012	5,072	12,890	7,818
	1904	14	3,657	2	322	3,333	22,860	14,797	388	1,848	4,403	9,037	4,634
	1899	25			143	2,863	21,967	7,482	216	1,154	2,689	5,325	2,636
Missouri.....	1909	9	845	42	184	619	886	3,950	338	333	2,224	3,640	1,416
	1904	11	327	1	186	640	1,330	4,366	233	310	2,172	3,279	1,107
	1899	8	419	1	78	340	344	1,970	112	162	1,336	1,804	468
New Jersey.....	1909	50	5,937	4	887	5,046	13,880	24,355	1,594	2,895	12,257	22,824	10,567
	1904	47	4,048	26	425	3,597	9,082	16,294	678	1,853	6,630	13,024	6,394
	1899	61	3,488	38	402	3,048	8,147	17,285	577	1,575	6,995	12,207	5,212
New York.....	1909	74	6,869	19	1,104	5,746	116,197	46,465	1,623	3,376	19,709	35,346	15,637
	1904	63	5,845	30	848	4,967	66,649	23,149	1,274	2,678	12,958	23,022	10,064
	1899	92	5,057	23	503	4,531	33,950	22,106	719	2,303	8,670	15,994	7,324
Ohio.....	1909	33	1,346	17	197	1,132	11,715	8,994	324	749	4,748	7,742	2,994
	1904	18	1,304	10	269	1,025	6,169	3,655	400	652	3,003	4,590	1,587
	1899	35	794	21	164	609	1,280	3,670	199	340	2,084	3,576	1,492
Pennsylvania.....	1909	37	3,573	19	369	3,185	9,771	23,535	559	1,892	10,200	15,978	5,778
	1904	41	3,692	29	290	3,373	10,662	20,657	456	1,892	7,265	11,774	4,509
	1899	100	4,747	54	415	4,278	12,442	22,757	573	2,198	6,806	13,034	6,228
Wisconsin.....	1909	5	115	3	36	76	495	329	39	41	242	513	271
	1904	5	96	2	29	65	243	194	23	29	137	265	128
	1899	4	99	2	33	64	205	288	43	26	131	254	123
All other states.....	1909	38	2,281	9	348	1,924	15,906	12,497	384	1,074	2,048	5,070	3,022
	1904	24	691	9	79	603	7,233	2,647	104	284	1,285	2,071	786
	1899	37			102	1,221	5,633	5,599	111	511	1,390	3,014	1,624

¹ Includes establishments in the industries designated "sulphuric, nitric, and mixed acids" and "wood distillation, not including turpentine and rosin."

CHEMICALS—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.				
					Male.	Fe-Male.	Average number.	Number, 15th day of—			Male.	Fe-male.	Male.	Fe-male.			
								Maximum month.	Minimum month.								
United States.....	349	27,791	154	932	2,492	499	23,714	De 25,073	Ja 22,909	25,341	24,102	1,061	103	75	208,604		
California.....	13	294	2	22	19	7	244	No 361	Mh 195	360	350	10	.....	.....	1,308
Georgia.....	4	75	2	7	9	4	53	Oc 57	Jy 47	55	43	7	.....	.....	200
Illinois.....	19	972	2	37	69	28	836	No 993	Fe 660	976	964	12	.....	.....	5,907
Kentucky.....	5	49	2	7	1	.....	39	Au 44	Ja ¹ 36	37	37	.....	.....	.....	102
Louisiana.....	4	52	1	3	.....	2	36	Mh 56	Jy 29	37	37	.....	.....	.....	159
Maryland.....	3	316	.....	7	16	8	285	Oc ¹ 321	Ja 231	315	313	2	.....	.....	1,855
Massachusetts.....	24	1,604	9	49	133	55	1,358	My 1,412	Fe 1,287	1,391	1,257	105	14	15	3,731		
Michigan.....	36	3,512	25	89	199	25	3,174	De 3,405	Ap 2,889	3,406	3,372	26	8	.....	26,594	
Missouri.....	9	845	42	48	112	24	619	No 648	Ja ¹ 601	642	533	68	24	17	886		
New Jersey.....	50	5,937	4	213	587	87	5,046	De 5,252	Au 4,780	5,267	4,758	458	17	34	13,880		
New York.....	74	6,869	19	228	714	162	5,746	De 6,130	Mh 5,480	6,123	5,932	177	7	7	116,197		
Ohio.....	33	1,346	17	60	107	30	1,132	No 1,242	Je 1,051	1,282	1,241	41	.....	.....	11,715
Pennsylvania.....	37	3,573	19	83	242	44	3,185	Je 3,311	Mh 3,072	3,286	3,174	110	.....	2	9,771	
Wisconsin.....	5	115	3	4	26	6	76	Se 85	Ja 68	76	63	13	.....	.....	495
All other states ²	33	2,232	7	75	248	17	1,885	.....	.....	2,088	2,023	32	33	.....	15,804

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States.....	\$155,143,739	\$93,991,193	\$3,134,056	\$3,002,532	\$14,084,501	\$3,046,840	\$56,074,696	\$187,805	\$689,074	\$181,011	\$8,610,678	\$117,688,837	\$53,567,351
California.....	2,788,028	1,155,870	40,160	25,505	168,190	71,461	690,124	720	12,873	.....	146,837	1,306,373	544,788
Georgia.....	378,568	190,030	16,700	11,852	24,342	7,383	52,592	5,731	2,812	.....	68,618	245,725	185,750
Illinois.....	4,639,170	3,927,458	88,886	92,443	531,315	205,714	2,690,086	6,607	8,839	4,160	299,408	4,656,274	1,760,474
Kentucky.....	154,105	72,623	9,607	706	16,688	4,923	35,582	100	540	.....	4,477	94,710	54,205
Louisiana.....	337,320	242,806	7,840	10,542	21,430	7,392	164,546	920	1,993	.....	28,143	248,815	76,877
Maryland.....	1,675,900	943,885	18,400	18,391	158,346	60,006	623,982	.....	7,435	16,539	40,786	1,313,103	629,115
Massachusetts.....	5,185,221	5,048,399	164,928	219,742	811,378	187,060	2,861,192	9,147	44,009	.....	750,943	5,916,451	2,868,199
Michigan.....	20,015,346	8,592,007	322,015	237,725	2,012,122	2,487,283	2,585,098	1,215	93,476	.....	853,073	12,890,206	7,817,825
Missouri.....	3,950,186	3,356,570	119,832	218,444	333,338	61,982	2,161,982	9,300	20,806	.....	430,886	3,640,116	1,416,152
New Jersey.....	24,355,116	18,881,485	856,382	737,417	2,894,964	690,321	11,567,157	27,099	109,394	100,996	1,897,755	22,824,140	10,566,662
New York.....	46,464,550	27,482,455	792,610	830,270	3,375,688	2,707,706	17,000,848	66,760	250,819	7,864	2,449,890	35,346,072	15,637,518
Ohio.....	8,993,786	6,268,370	194,180	129,748	748,913	566,999	4,181,297	11,687	43,324	.....	392,222	7,742,045	2,993,749
Pennsylvania.....	23,534,639	13,503,136	304,829	254,228	1,892,313	509,580	9,690,341	10,990	42,142	269	798,444	15,978,162	5,778,241
Wisconsin.....	329,217	407,069	7,737	31,314	41,324	7,666	234,471	8,848	1,615	.....	74,094	513,099	270,962
All other states ²	12,342,587	3,919,030	189,950	184,205	1,054,150	471,364	1,535,398	8,681	48,997	51,183	375,102	4,973,596	2,966,834

¹ Same number reported for one or more other months.

² "All other states" embrace: Connecticut, 3 establishments; District of Columbia, 1; Florida, 1; Indiana, 4; Kansas, 1; Maine, 1; Minnesota, 4; Montana, 1; Nebraska, 2; Rhode Island, 3; Texas, 2; Vermont, 1; Virginia, 4; Washington, 2; West Virginia, 2; Wyoming, 1.

BONE, CARBON, AND LAMPBLACK

MANUFACTURE OF BONE, CARBON, AND LAMP BLACK.

Scope of the industry.—The census classification “bone, carbon, and lamp black” covers establishments engaged primarily in the carbonization of bones in retorts, producing bone black; in the manufacture of carbon black by the burning of natural gas, the flame impinging upon slate or metallic slabs or revolving cylinders with a deposition of carbon; and in the production of lampblack by the imperfect combustion of coal and wood tar, petroleum, rosin, etc. The industry also includes establishments engaged primarily in the manufacture of ivory black, a pigment made by the carbonization of ivory scraps and waste. At prior censuses the industry was known as “bone, ivory, and lamp black.”

Comparison with earlier censuses.—At the census of 1849, 5 establishments were reported as engaged in the manufacture of bone, ivory, and lamp black, these establishments giving employment on the average to 24 hands and turning out products valued at \$42,250. At the census of 1859, 24 establishments were reported, with an average of 168 hands and products valued at \$376,710; and at the census of 1869, 9 establishments were reported, employing on the average 56 hands and turning out products valued at \$193,800. The variations from census to census may be due to differences in the classification of individual establishments.

Table 1 summarizes the statistics of the industry for each census from 1879 to 1909, inclusive.

Table 1	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	27	25	15	24	18	80.0	8.0	66.7	-37.5	33.3
Persons engaged in the industry.....	302	258	123	(²)	(²)	145.5	17.1	109.8	.....	.....
Proprietors and firm members.....	7	11	17	(²)	(²)	-58.8	-36.4	-35.3	.....	.....
Salaried employees.....	67	47	21	(²)	(²)	219.0	42.6	123.8	.....	.....
Wage earners (average number).....	228	200	85	323	224	168.2	14.0	135.3	(³)	(³)
Primary horsepower.....	1,023	1,085	365	(²)	(²)	180.3	-5.7	197.3	.....	.....
Capital.....	\$1,841,966	\$1,663,143	\$782,247	\$1,627,651	\$627,350	135.5	10.8	112.6	-51.9	159.4
Expenses.....	833,510	426,499	251,147	787,027	520,317	231.9	95.4	69.8	-68.1	51.3
Services.....	227,660	153,649	69,757	216,288	80,249	226.4	48.2	120.3	-67.7	169.5
Salaries.....	78,333	48,490	23,650	(²)	(²)	231.2	61.5	105.0	.....	.....
Wages.....	149,327	105,159	46,107	(²)	(²)	223.9	42.0	128.1	.....	.....
Materials.....	444,608	203,396	105,712	485,867	440,068	320.6	118.6	92.4	-78.2	10.4
Miscellaneous.....	161,242	69,454	75,678	84,872	(²)	113.1	132.2	-8.2	-10.8	.....
Value of products.....	1,093,494	647,717	359,787	1,031,030	661,376	203.9	68.8	80.0	-65.1	55.9
Value added by manufacture (value of products less cost of materials).....	648,886	444,321	254,075	545,163	221,308	155.4	46.0	74.9	-53.4	146.3

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The statistics indicate that there was a general growth in the industry during each intercensal period covered by the table except the decade 1889-1899, for which period large decreases are shown. The decreases for this decade are no doubt due in part to changes in classification whereby establishments included under the classification “bone, ivory, and lamp black” in 1889 were assigned to other industries in 1899.

At the census of 1909, 27 establishments were reported as engaged primarily in the manufacture of bone black, carbon black, and lamp black, these establishments employing an average of 228 wage earners and paying out \$149,327 in wages during the year. The value of their products amounted to \$1,093,494, and the cost of materials used to \$444,608, equal to 40.7 per cent of the value of products, the value added by manufacture being \$648,886.

Persons engaged in the industry.—The average number of persons engaged in the industry during 1909

was 302, of whom 228, or 75.5 per cent were wage earners, 52, or 17.2 per cent, were proprietors and officials, and 22, or 7.3 per cent, clerks, the last-named class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 286, or 94.7 per cent, were males and 16, or 5.3 per cent, females, 8 of the latter being employed as clerks and 8 as wage earners.

Wage earners employed, by months.—The largest number of wage earners reported for any month of 1909 was 243, for October, and the smallest number, 215, equal to 88.5 per cent of the maximum, was reported for both February and March. In 1904 the maximum number, 218, was reported for December and the minimum number, 182, for January, the latter number being equal to 83.5 per cent of the maximum.

Prevailing hours of labor.—Of the 228 wage earners in the industry, 85, or 37.3 per cent were employed in establishments where the prevailing hours of labor per week were from 54 to 60 inclusive, 79, or 34.6 per

cent, in establishments where the prevailing hours were 72 or more per week, and 64, or 28.1 per cent, in establishments where the prevailing hours were from 48 to 54 per week.

Character of ownership.—Of the 27 establishments in the industry in 1909, 22, with products valued at \$928,242, or 84.9 per cent of the total for the industry, were under corporate ownership. There were 4 establishments under individual ownership and 1 under firm ownership. The average number of wage earners in the establishments owned by corporations was 192, and the value added by manufacture \$546,357.

Size of establishments.—Table 2 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	27	25	\$1,093,494	\$647,717
Less than \$5,000.....	3	4	7,114	9,479
\$5,000 and less than \$20,000.....	7	7	85,163	74,142
\$20,000 and less than \$100,000.....	13	14	519,114	564,096
\$100,000 and less than \$1,000,000.....	4	.....	481,103	.....
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	11.1	16.0	0.6	1.5
\$5,000 and less than \$20,000.....	25.9	28.0	7.9	11.4
\$20,000 and less than \$100,000.....	48.1	56.0	47.5	87.1
\$100,000 and less than \$1,000,000.....	14.8	.....	44.0	.....

¹ Percentage not shown where base is less than 100.

Establishments manufacturing products valued at \$20,000 but less than \$100,000 constituted the most important class at each census, both numerically and as measured by value of products, reporting 47.5 per cent of the total value of products for the industry in 1909 and 87.1 per cent in 1904. In 1904 no establishments with products valued at as much as \$100,000 were reported; in 1909 there were four such establishments, which reported 44 per cent of the total value of products. The average value of products per establishment increased from \$25,909 in 1904 to \$40,500 in 1909 and the average value added by manufacture, as computed from the figures in Table 1, from \$17,773 in 1904 to \$24,033 in 1909. The average number of wage earners per establishment shows a slight increase, from 8 in 1904 to 8.4 in 1909.

Of the 27 establishments in 1909, 1 employed no wage earners; 15 employed from 1 to 5 wage earners; 9, from 6 to 20; and 2, from 21 to 50.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no

account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 4 shows the total expenses in 1909 to have been \$833,510, distributed as follows: Cost of materials, \$444,608, or 53.3 per cent; wages, \$149,327, or 17.9 per cent; salaries, \$78,333, or 9.4 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$161,242, or 19.3 per cent.

Engines and power.—All of the establishments in the industry reported the use of power, a total of 1,023 horsepower being reported for 1909. Of the total primary power steam engines furnished 537 horsepower and gas engines 476 horsepower, while the remainder represented rented electric power.

Fuel consumed.—In 1909, 3,579 short tons of bituminous coal, 46,000 barrels of oil, and 12,516,733,000 cubic feet of gas were consumed in the industry for all purposes. The amount expended for fuel and rent of power in 1909, as shown in Table 4, was \$158,604. The bulk of the oil and gas used was consumed as material in the manufacture of lampblack and carbon black, respectively, but little of either being employed in the generation of power.

Products.—In addition to the output of establishments manufacturing bone, carbon, and lamp black as their chief product a considerable quantity was reported by establishments engaged in the production of pigments in the paint and varnish industry, and by establishments in other industries. Table 3 shows the total production of these blacks in 1909, so far as statistics are available.

PRODUCT.	Number of establishments reporting: 1909	VALUE: 1909			
		Total.	Reported by establishments engaged primarily in the manufacture of—		
			Bone, carbon, and lamp black	Paint and varnish.	Fertilizers and glue.
Bone, carbon, and lamp black.	57	\$2,135,554	\$1,068,496	\$105,063	\$961,995
Bone black.....	7	1,070,333	108,338	.....	961,995
Carbon black.....	18	625,514	625,514	.....	.....
Lampblack.....	32	439,707	334,644	¹ 105,063	.....

¹ Reported as lamp and other blacks.

The total production of bone, carbon, and lamp black reported for 1909 was valued at \$2,135,554, of which

amount approximately one-half was reported by establishments engaged primarily in the manufacture of fertilizers, glue, and paint and varnish. Approximately one-half of the total represented the value of bone black, three-tenths that of carbon black, and one-fifth that of lampblack.

Detailed state table.—The principal statistics secured for 1909 concerning the "bone, carbon, and lamp black" industry are presented in Table 4.

West Virginia ranked first among the states in the industry, as measured by value of products, in both 1909 and 1904, and Pennsylvania second, the prominence of these states in the industry resulting largely from their supply of natural gas, which is used in the manufacture of carbon black. New Jersey ranked third in 1909. The products of West Virginia, the only state for which statistics can be shown without disclosing individual operations, were valued at \$596,058 in 1909, contributing 54.5 per cent of the total for the industry, as compared with products valued at \$274,022, and representing 42.3 per cent of the total, in 1904. The increase in value of products for the industry as a whole during this five-year period amounted to 68.8 per cent, while for West Virginia alone, it amounted to 117.5 per cent.

Table 4	United States.	West Virginia.	All other states. ¹
Number of establishments.....	27	16	11
Persons engaged in the industry.....	302	137	165
Proprietors and firm members.....	7	1	6
Salaried officers, superintendents, and managers.....	45	28	17
Clerks.....	22	7	15
Male.....	14	5	9
Female.....	8	2	6
Wage earners (average number).....	228	101	127
Number 15th day of month:			
Maximum—			
Month.....	October.	January.	.....
Number.....	243	104	.....
Minimum—			
Month.....	February. ²	November.	.....
Number.....	215	95	.....
Wage earners—Dec. 15, or nearest representative day.....	243	102	141
16 years of age and over.....	243	102	141
Male.....	235	102	133
Female.....	8	.....	8
Primary horsepower.....	1,023	641	382
Capital.....	\$1,841,966	\$1,313,226	\$528,740
Expenses.....	833,510	426,050	407,460
Services.....	227,660	101,379	126,281
Officials.....	58,629	31,350	27,279
Clerks.....	19,704	3,780	15,924
Wage earners.....	149,327	66,249	83,078
Materials.....	444,608	249,038	195,570
Fuel and rent of power.....	158,604	116,983	41,621
Other.....	286,004	132,055	153,949
Miscellaneous.....	161,242	75,633	85,609
Rent of factory.....	12,027	5,677	6,350
Taxes, including internal revenue.....	10,324	5,682	4,642
Other.....	138,891	64,274	74,617
Value of products.....	1,093,494	596,058	497,436
Value added by manufacture (value of products less cost of materials).....	648,886	347,020	301,866

¹ Includes the following, with number of establishments as indicated: Massachusetts, 3; New Jersey, 1; New York, 1; Ohio, 1; Pennsylvania, 5.

² Same number reported for one or more other months.

DYESTUFFS AND EXTRACTS

THE MANUFACTURE OF DYESTUFFS AND EXTRACTS.

Scope of the industry.—The manufacture of dyestuffs and extracts used in the dyeing industry and that of extracts used in the tanning industry are so closely associated that since the census of 1879 the statistics for the two have been combined under the designation "dyestuffs and extracts." The class of dyestuffs comprises: (1) Natural dyestuffs, including logwood, fustic, quercitron, cochineal, lac dye, kermes, gambier, Persian berries, curcuma, Brazil wood, madder, catch, and yellow oak bark, the ground and chipped wood, bark, or berries of these natural dyestuffs, and extracts such as logwood extract; (2) artificial dyestuffs, such as the aniline, phenol, azo, quinoline, and anthracene colors, including synthetic indigo, and the so-called coal tar dyes, special compositions or mixtures of dyes, and mineral dyes used in printing, such as chrome yellow, orange and green, iron buff or nankin yellow, prussian blue, ultramarine, and manganese brown; (3) mordants, such as myrobalans, valonia, divi-divi, chestnut, nutgalls, oak and hemlock barks, the ground product and the extracts of these materials, and special mordanting liquors containing inorganic compounds; and (4) assistants, such as turkey red oil, iron liquor (black liquor, pyrolignite of iron), red liquor (aluminum sulpho-acetate), gums, dextrins, and sizes.

The class of tanning materials includes the ground, chipped, or comminuted products of oak, chestnut, and hemlock wood or bark, palmetto roots, and sumac leaves; the fluid or solid extracts from these materials or from quebracho wood, quercitron bark, or other tannin-containing materials; tannic or gallic acid; and chrome tannage or other tannage solutions.

The statistics pertain only to establishments producing dyestuffs or tanning materials for sale, and do not represent the entire manufacture of these products, as there is also a large production by establishments that use them in their own processes. This is especially true of the various textile industries and is often true also in regard to the tanning industry.

Summary and comparison with earlier censuses.—Table 1 summarizes the statistics of the industry for each census from 1869 to 1909, inclusive. At the census of 1849 there were reported 41 establishments with 114 wage earners and products valued at \$229,841, and at the census of 1859, 40 establishments with 76 wage earners and products valued at \$171,253.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	107	98	(²) 77	(²) 62	(²) 41	(²) 73	39.0	9.2	27.3	24.2	51.2	-43.8
Persons engaged in the industry.....	3,015	3,150	(²)	(²)	(²)	(²)	-4.3	-20.7				
Proprietors and firm members.....	65	82	(²)	(²)	(²)	(²)	141.5	53.2	57.6			
Salaried employees.....	553	361	(²) 229	(²)	(²)	(²)	45.5	-11.5	64.4	(²)	(²)	(²)
Wage earners (average number).....	2,397	2,707	1,647	2,111	(²) 992	803	94.7	25.7	54.9	-3.9		
Primary horsepower.....	22,213	17,671	11,409	11,896	(²)	2,694	128.8	20.3	90.1	-9.3	265.8	31.1
Capital.....	\$17,934,545	\$14,904,160	\$7,839,034	\$8,645,458	\$2,363,700	\$1,802,710	114.0	39.9	53.0	-22.9		
Expenses.....	13,492,987	9,646,982	6,304,175	8,170,945	(²)	(²)	103.1	19.2	70.3	-14.7	151.9	28.5
Services.....	2,233,705	1,873,282	1,100,051	1,289,987	512,097	398,649	201.9	54.8	95.1	23.7		
Salaries.....	942,326	608,790	312,109	252,336	(²)	(²)	63.9	2.1	60.5	-24.1		
Wages.....	1,291,379	1,264,492	787,942	1,037,651	(²)	(²)	104.0	41.8	43.9	-27.0	65.9	135.0
Materials.....	9,683,651	6,829,340	4,745,912	6,500,928	3,918,741	1,667,257	243.9	66.8	106.1	20.6		
Miscellaneous.....	1,575,631	944,360	458,212	380,030	(²)	(²)	117.0	46.5	48.2	-20.9	76.9	82.5
Value of products.....	15,954,574	10,893,113	7,350,748	9,292,514	5,253,038	2,878,609						
Value added by manufacture (value of products less cost of materials).....	6,270,923	4,063,773	2,604,836	2,791,586	1,334,297	1,211,352	140.7	54.3	56.0	-6.7	109.2	10.1

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available.
³ Figures not strictly comparable.

The value of products reported for 1909 was five and a half times the value reported for 1869, part of this increase, however, being attributable to the general advance in prices. With the exception of the decade 1889-1899, in which decreases took place in most of the items included in the table, the industry has shown a substantial growth at each successive census.

Summary, by states.—Table 2 summarizes the more important statistics, by states, the states being arranged according to the value of products reported for 1909. The states shown in this table are given their actual ranking among all states, the rank of certain states for which data can not be presented being higher than that of some named in the table.

In 1909 New York, New Jersey, and Pennsylvania, in order, were the three leading states when ranked by value of products, these states combined reporting 62.6 per cent of the total value of products, 60.1 per cent of the value added by manufacture, and 44.5 per

cent of the average number of wage earners. New Jersey shows the largest relative increase in value of products and value added by manufacture during the decade 1899-1909, 522.6 per cent and 426.8 per cent, respectively.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹											
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.		
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States.....	107	2,397	100.0	.....	.....	\$15,954,574	100.0	.....	.....	\$6,270,923	100.0	.....	.....	45.5	-11.5	64.4	117.0	46.5	48.2	140.7	54.3	56.0
New York.....	18	418	17.4	1	1	4,505,310	28.2	1	1	1,638,233	26.1	1	1	-22.3	-19.5	-3.5	113.3	66.5	28.1	93.2	55.4	24.3
New Jersey.....	13	279	11.7	5	5	3,130,214	19.6	2	2	1,161,484	18.5	2	2	.....	11.6	.....	522.6	43.8	332.8	426.8	71.7	206.8
Pennsylvania.....	14	369	15.4	2	6	2,345,251	14.7	3	4	972,076	15.5	3	6	43.6	81.8	-21.0	84.8	142.7	-23.9	58.9	188.6	-44.6
Tennessee.....	6	336	14.0	4	4	1,313,020	8.2	4	6	671,089	10.7	4	4	.....	29.7	.....	82.3	.....	.....	.....	87.5	.....
Virginia.....	14	346	14.4	3	3	1,199,706	7.5	5	5	513,427	8.2	5	5	72.1	-18.4	110.9	150.3	62.9	53.7	198.7	49.3	100.0
Rhode Island.....	10	87	3.6	8	9	927,676	5.8	6	9	296,012	4.7	7	9	.....	.....	.....	80.8	.....	.....	.....	59.3	.....
Massachusetts.....	10	80	3.3	9	8	725,386	4.5	7	3	213,767	3.4	8	3	.....	-46.7	.....	-45.1	-27.4	-24.4	8.5	-44.1	94.2
All other states.....	22	482	20.1	.....	.....	1,808,011	11.4	.....	.....	804,835	12.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	3,015	2,901	114
Proprietors and officials.....	264	262	2
Proprietors and firm members.....	65	64	1
Salaried officers of corporations.....	91	91	.....
Superintendents and managers.....	108	107	1
Clerks.....	354	278	76
Wage earners (average number).....	2,397	2,361	36
16 years of age and over.....	2,391	2,355	36
Under 16 years of age.....	6	6	.....

The average number of persons engaged in the industry during 1909 was 3,015, of whom 2,397, or 79.5 per cent, were wage earners; 264, or 8.8 per cent, were proprietors and officials; and 354, or 11.7 per cent, were clerks, this class including other subordinate salaried employees. Of the total number engaged in the industry, 96.2 per cent were males and 3.8 per cent were females. Of the wage earners, 2,355 were men, 36 were women, and 6 were boys under 16 years of age. In 1904 there were 2,707 wage earners, comprising 2,678 males and 25 females 16 years of age and over, and 4 children under 16 years of age.

Wage earners employed, by months.—The industry is not subject to any considerable seasonal variations. The largest number of wage earners employed during any month in 1909 was 2,478, reported for August, and the smallest number 2,293, reported for January, the latter number being equal to 92.5 per cent of the maximum number. In 1904 the maximum number of wage earners, 2,925, was reported for August, and the minimum, 2,340, for December, the latter number being equal to 80 per cent of the maximum.

Prevailing hours of labor.—The wage earners in the industry have been classified according to the hours of labor prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total, according to the hours prevailing in that establishment, even though some of the employees may have worked a greater or less number of hours. Of the 2,397 wage earners in the industry, 1,361, or 56.8 per cent of the total, were employed in establishments where the usual hours were 60 per week; 545, or 22.7 per cent, worked in establishments where less than 60 hours per week was the usual working time; and 491, or 20.5 per cent, were in establishments where the working time was over 60 hours per week.

Character of ownership.—Table 4 presents data with respect to the character of ownership of the establishments in the industry for 1909 and 1904.

Of the total number of establishments in the industry, 64.5 per cent were under corporate ownership in 1909, as compared with 56.1 per cent in 1904; these establishments reported 91.2 per cent of the total value of products in 1909 and 86.2 per cent in 1904.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	107	98	\$15,954,574	\$10,893,113
Individual.....	23	22	946,201	806,069
Firm.....	15	21	449,828	692,469
Corporation.....	69	55	14,558,545	9,394,575
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	21.5	22.4	5.9	7.4
Firm.....	14.0	21.4	2.8	6.4
Corporation.....	64.5	56.1	91.2	86.2

Size of establishments.—Table 5 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	107	98	\$15,954,574	\$10,893,113
Less than \$5,000.....	10	9	25,338	(1)
\$5,000 and less than \$20,000.....	19	17	240,409	(1)
\$20,000 and less than \$100,000.....	36	39	1,892,747	1,856,948
\$100,000 and over.....	42	33	13,795,580	27,596,825
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	9.3	9.2	0.2	.....
\$5,000 and less than \$20,000.....	17.8	17.3	1.5	.....
\$20,000 and less than \$100,000.....	33.6	39.8	11.9	17.0
\$100,000 and over.....	39.3	33.7	86.5	69.7

¹ Figures can not be shown without disclosing individual operations.

² Excluding figures for one establishment to avoid disclosure of individual operations.

Of the 107 establishments in 1909 there were 42, or 39.3 per cent of the total, whose products were valued at more than \$100,000, including 2 with products valued at \$1,000,000 and over. These 42 establishments reported 86.5 per cent of the total value of products of the industry.

The average value of products per establishment increased from \$111,154 in 1904 to \$149,108 in 1909, and the value added by manufacture from \$41,467 to \$58,607, while the average number of wage earners per establishment decreased from 28 in 1904 to 22 in 1909.

In some respects, and especially from the standpoint of conditions under which persons engaged in manufactures work, the best classification of establishments to bring out the feature of size is a classification according to the number of wage earners employed. From this standpoint, the majority of the establishments engaged in the industry are comparatively small. Of the 107 establishments in 1909, 3 employed no wage earners, 36 from 1 to 5 wage earners, 35 from 6 to 20, 20 from 21 to 50, 7 from 51 to 100, and 6 more than 100 wage earners. No establishments employed over 250 wage earners.

Of the 2,397 wage earners in 1909, 462, or 19.3 per cent, were in establishments employing from 1 to 20 wage earners; 687, or 28.7 per cent, in establishments employing from 21 to 50; 491, or 20.5 per cent, in establishments employing from 51 to 100; and 757, or 31.6 per cent, in establishments employing more than 100 wage earners.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation, and consequently can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported.

Table 1 shows the total reported expenses to have been \$13,492,987, distributed as follows: Cost of materials, \$9,683,651, or 71.7 per cent; wages, \$1,291,379, or 9.6 per cent; salaries, \$942,326, or 7 per cent; and miscellaneous expenses, made up of traveling expenses, advertising, ordinary repairs of buildings and machinery, insurance, and other sundry expenses, \$1,575,631, or 11.7 per cent.

Engines and power.—As shown by Table 1, the amount of primary power reported for this industry at the census of 1869 was 2,694, which had increased to 22,213 in 1909. Table 6 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current), and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows the number and horsepower of electric motors, including those operated by current generated in the establishments reporting.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	270	201	154	22,213	17,671	11,409	100.0	100.0	100.0
Owned.....	251	199	154	22,020	17,624	11,133	99.1	99.7	97.6
Steam.....	247	192	144	21,685	17,348	10,508	97.6	98.2	92.1
Gas.....	1	1	1	15	4	300	0.1	(1)	2.6
Water wheels.....	3	6	9	320	196	325	1.4	1.1	2.8
Other power.....	.....	.....	.....	.....	76	.....	.....	0.4	.....
Rented.....	19	2	.....	193	47	276	0.9	0.3	2.4
Electric motors..	19	2	(2)	191	20	20	0.9	0.1	0.2
Other.....	.....	.....	.....	2	27	256	(1)	0.2	2.2
Electric motors.	106	35	15	1,664	659	179	100.0	100.0	100.0
Run by current generated by establishment.....	87	33	15	1,473	639	159	88.5	97.0	88.8
Run by rented power.....	19	2	.....	191	20	20	11.5	3.0	11.2

¹ Less than one-tenth of 1 per cent.

² Not reported.

The total primary power used in the industry increased 94.7 per cent from 1899 to 1909, the increase being practically all in steam power. Of the total primary horsepower, 97.6 per cent was steam power in 1909, as compared with 92.1 per cent in 1899. The amount of rented electric power used in the industry is small. The horsepower of electric motors operated by current generated in the establishment reporting increased from 159 in 1899 to 1,473 in 1909.

Fuel consumed.—Table 7 shows the amount of each kind of fuel consumed in the industry in 1909. The amount expended for fuel and rent of power is shown, by states, in Table 10.

KIND.	Unit.	Quantity.
Anthracite coal.....	Long tons.....	20,669
Bituminous coal.....	Short tons.....	164,789
Coke.....	Short tons.....	31
Wood.....	Cords.....	17,182
Oil, including gasoline.....	Barrels.....	2,200
Gas.....	1,000 feet.....	223,467

Materials and products.—The special schedule used in collecting the statistics from the manufacturers of dyestuffs and extracts called for the quantity and cost of acids (sulphuric, nitric, and mixed) and alcohol (grain and wood) consumed in this industry, the quantity and value of the different products, and the quantity of certain products made and consumed in the establishments producing them.

In 1909 there was reported the consumption of 8,303 tons of sulphuric acid, costing \$72,638; 85 tons of nitric acid, costing \$7,066; 242 tons of mixed acid, costing \$17,291; 6,341 gallons of grain alcohol, costing \$3,309; and 724 gallons of wood alcohol, costing \$391. Comparative data for the consumption of these materials in former years are not available except with respect to sulphuric acid, the consumption of which in 1904 was 1,779 tons, costing \$49,779. In 1909 certain specific materials were called for, but in 1904 the selection was left to the manufacturer.

Table 8 gives the quantity and value of the chief products reported by the establishments engaged primarily in the manufacture of dyestuffs and extracts in 1909, 1904, and 1899.

PRODUCT.	1909	1904	1899	PRODUCT.	1909	1904	1899
Total value	\$15,954,574	\$10,893,113	\$7,350,748	Gums and dextrins:			
Artificial dyestuffs:				Pounds.....	16,148,931	6,651,731	(²)
Pounds.....	12,267,399	4,600,462	6,581,850	Value.....	\$610,999	\$231,708	(²)
Value.....	\$3,462,436	\$1,764,454	\$1,806,730	Iron liquors:			
Extracts:				Pounds.....	3,079,418	1,860,744	954,240
Hemlock—				Value.....	\$30,282	\$30,757	\$7,525
Pounds.....	12,588,078	18,833,450	26,011,714	Mordants:			
Value.....	\$220,487	\$406,619	\$563,591	Pounds.....	1,735,887	733,245	734,000
Logwood—				Value.....	\$69,515	\$64,656	\$85,466
Pounds.....	22,317,248	29,799,606	39,252,743	Sizes:			
Value.....	\$991,974	\$1,472,047	\$1,485,971	Pounds.....	54,054,711	7,812,433	101,920
Oak and chestnut—				Value.....	\$1,735,600	\$217,859	\$2,548
Pounds.....	287,908,285	156,520,123	28,983,036	Tannic acid:			
Value.....	\$6,061,162	\$2,411,184	\$529,670	Pounds.....	5,085,748	5,165,500	1,326,515
Sumac—				Value.....	\$249,297	\$200,136	\$149,662
Pounds.....	3,148,790	4,093,619	4,349,742	Turkey-red oil:			
Value.....	\$107,456	\$95,958	\$103,085	Pounds.....	1,048,719	3,022,470	2,210,000
Ground sumac:				Value.....	\$72,053	\$159,666	\$14,757
Pounds.....	554,032	5,061,333	9,284,000	Chrome tannage solution:			
Value.....	\$24,531	\$65,190	\$114,660	Pounds.....	7,361,008	2,847,400	(²)
Ground bark:				Value.....	\$298,830	\$85,422	(²)
Pounds.....	25,142,076	38,001,017	27,028,000	Other tanning liquors:			
Value.....	\$176,510	\$249,101	\$149,365	Pounds.....	2,464,040	43,311,529	16,144,292
Ground and chipped wood:				Value.....	\$77,274	\$1,653,621	\$405,659
Pounds.....	15,046,954	9,999,906	12,690,037	All other products ³	\$1,562,448	\$1,689,498	\$1,730,128
Value.....	\$143,720	\$85,237	\$201,931				

¹ In addition, dyestuffs and extracts to the value of \$834,102 in 1909, and \$19,111 in 1904, were produced by establishments engaged primarily in the manufacture of other products.

² Not reported separately.

³ Including a small production of natural dyestuffs in 1909, a production in 1904 valued at \$233,935, and a production in 1899 valued at \$1,035,711.

In addition to the products shown above, the products shown in the following table were made and used in further processes of manufacture in the establishments where produced.

PRODUCT.	1909	1904
Ground and chipped wood.....pounds..	936,578,482	524,505,744
Ground bark.....pounds..	293,062,168	40,390,640
Ground leaves.....pounds..	1,955,040	3,586,171

By far the most important products, both in quantity and value, in 1909, was oak and chestnut extracts. There has been a very great increase in the quantity and value of these products since 1899. Other important increases are shown by artificial dyestuffs, iron liquors, sizes, and tannic acid, while considerable decreases are shown in the production of hemlock and logwood extracts, and of ground sumac.

In addition to the items in the table, there was reported in 1909 a small production of natural dyestuffs which can not be given without disclosing individual operations and which was considerably less than in 1904, when the production was valued at \$233,935, or in 1899, when it was valued at \$1,035,711.

The report on Forest Products ¹ for 1909 gives 386,817,895 pounds as the total consumption of tanning extracts in that year, which quantity exceeds the quantity of oak, chestnut, hemlock, and sumac extracts here reported by over 83,000,000 pounds. This difference may be assumed to represent the tanning extracts imported or made and consumed in tanning establishments.

In addition to the production above reported, dyestuffs and tanning materials to the value of \$834,102 in 1909 and to the value of \$19,111 in 1904 were produced as subsidiary products by establishments engaged primarily in the manufacture of chemicals, flavoring extracts, and miscellaneous products other than dyestuffs and extracts. Including the subsidiary products reported, which, however, presumably do not cover all such products made in other industries, the total production of artificial dyes in 1909 was approximately 12,759,000 pounds; of mordants, 1,788,000 pounds; of sizes, 57,400,000 pounds; of tannic acid, 8,000,000 pounds; and of turkey-red oil, 3,398,000 pounds.

¹ Department of Commerce and Labor, Bureau of the Census, Forest Products of the United States, 1909.

Table 10 gives for 1909 the production of the specific products reported by establishments manufacturing dyestuffs and tanning materials as their principal products for the United States and for individual states as far as such statistics can be presented without disclosing the operations of individual establishments.

PRODUCT AND STATE.		Pounds.	Value	PRODUCT AND STATE.		Pounds.	Value.
Artificial dyestuffs.....		12,267,399	\$3,462,430	Iron liquors.....		3,079,418	\$30,282
Massachusetts.....		1,848,980	239,495	Turkey-red oil.....		1,048,719	72,053
New Jersey.....		3,226,061	1,599,528	Chrome tannage solution.....		7,361,008	298,830
New York.....		5,371,951	1,477,456	New Jersey.....		7,102,328	285,576
All other states.....		1,820,407	145,957	All other states.....		258,680	13,254
Hemlock extract.....		12,588,078	280,487	Other tanning liquors.....		2,464,040	77,274
Logwood extract.....		22,317,248	991,974	Tannic acid.....		5,085,748	249,297
Oak and chestnut extract.....		287,908,285	6,061,162	Sizes.....		54,054,711	1,735,600
Pennsylvania.....		51,723,637	1,017,645	Massachusetts.....		6,027,359	118,098
Tennessee.....		85,053,193	1,205,390	New Jersey.....		2,971,767	152,380
Virginia.....		69,310,711	993,289	Rhode Island.....		9,943,453	387,930
All other states.....		81,820,744	2,844,838	All other states.....		35,112,132	1,077,192
Sumac extract.....		3,148,790	107,456	Gums and dextrans.....		16,148,931	610,999
Ground sumac.....		554,032	24,531	Massachusetts.....		5,103,361	216,829
Ground bark.....		25,142,076	176,510	All other states.....		11,045,570	394,170
Ground and chipped wood.....		15,046,954	143,720				
Mordants.....		1,735,887	69,515				
New Jersey.....		1,424,458	49,054				
All other states.....		311,429	20,461				

Detailed statistics, by states.—The principal data secured by the census inquiry concerning the dyestuff and extract industry are presented, by states, in Table 11, which gives detailed statistics for 1909 concerning the number of establishments, the number of persons engaged in the industry, the number of wage earners on December 15, or the nearest representative day, primary horsepower, capital, expenses, the total value of products, and the value added by manufacture.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.
								Maximum month.	Minimum month.						
United States.....	107	3,015	65	199	278	76	2,397	Au 2,478	Ja 2,293	2,465	2,422	37	6	22,213	
Georgia.....	3	46	3	1	1	.....	41	Ja 53	My 34	44	44	.....	.....	541
Massachusetts.....	10	114	6	14	11	3	80	Ja 85	Se 74	78	78	.....	.....	325
New Jersey.....	13	429	7	36	90	17	279	Au 287	Ap 270	281	263	15	3	1,066	
New York.....	13	579	7	38	84	32	418	Fe 444	Jy 392	404	390	14	.....	3,647
Pennsylvania.....	14	439	10	30	21	9	369	Se 438	My 316	372	371	.....	1	3,516
Rhode Island.....	10	118	7	13	7	4	87	Se ¹ 97	Ja 70	97	97	.....	.....	689
Tennessee.....	6	374	.....	18	19	1	336	De 371	My 307	371	368	1	2	4,119
Virginia.....	14	399	10	17	22	4	346	No 363	Oc 308	363	362	.....	.....	4,209
West Virginia.....	3	81	11	6	1	.....	63	Au 70	My 57	63	63	.....	.....	506
All other states ²	16	436	4	26	22	6	378	.....	.....	392	386	6	.....	3,655

STATE.	Capital.	EXPENSES.										Value added by manufacture (value of products less cost of materials).		
		Total.	Services.			Materials.			Miscellaneous.				Value of products.	
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.			
United States.....	\$17,934,545	\$13,492,987	\$570,075	\$372,251	\$1,291,379	\$462,189	\$9,221,462	\$34,907	\$71,508	\$4,738	\$1,484,478	\$15,954,574	\$6,270,923	
Georgia.....	294,455	108,171	1,217	1,453	19,180	12,532	50,806	426	817	.....	21,740	125,353	62,015
Massachusetts.....	396,064	650,163	34,426	12,572	49,975	12,345	499,274	7,920	3,265	4,468	25,918	725,386	213,767	
New Jersey.....	2,162,906	2,684,465	122,639	133,173	178,956	41,762	1,926,968	4,060	9,254	.....	267,653	3,130,214	1,161,484
New York.....	4,145,223	3,884,806	145,933	118,129	259,501	46,969	2,820,108	15,648	18,511	.....	460,007	4,505,310	1,638,233
Pennsylvania.....	3,009,245	1,909,192	58,424	18,278	186,826	95,865	1,277,310	1,245	10,263	.....	260,981	2,345,251	972,076
Rhode Island.....	607,057	832,562	36,965	19,630	81,753	16,141	615,523	3,600	1,376	.....	57,574	927,676	296,012
Tennessee.....	2,190,386	954,803	38,641	17,789	156,053	73,805	568,126	.....	6,932	.....	93,457	1,313,020	671,089
Virginia.....	1,873,916	1,018,718	34,828	24,842	123,032	71,599	614,680	63	8,280	.....	141,394	1,199,706	513,427
West Virginia.....	262,268	238,260	36,262	910	24,068	14,849	143,667	.....	647	.....	17,867	252,854	94,348
All other states ²	2,993,025	1,211,847	60,740	25,475	212,035	76,322	705,010	1,945	12,163	270	117,887	1,429,804	648,472	

¹ Same number reported for one or more other months.
² All other states embrace: California, 1 establishment; Connecticut, 1; Florida, 1; Illinois, 2; Indiana, 1; Maine, 2; Michigan, 2; North Carolina, 4; South Carolina, 1; Wisconsin, 1.

EXPLOSIVES

(565)

THE MANUFACTURE OF EXPLOSIVES.

GENERAL STATISTICS.

Scope of the industry.—The statistics for the manufacture of explosives cover the operations of commercial establishments engaged primarily in the manufacture of gunpowder and blasting powder, nitroglycerin, dynamite, guncotton, nitrosubstitution compounds and the explosives of which they are components, smokeless powder, and fulminates. Statistics for governmental establishments are not included except as specially noted. Establishments engaged primarily in the manufacture of cartridges, detonators and fuses, and other devices containing explosives are assigned to the industry bearing the designation "firearms and ammunition," while those making colored fires, rockets, railroad torpedoes, signal lights, and

similar products, are included under the heading of "fireworks."

Comparison with earlier censuses.—At the census of 1859, 58 establishments, with 747 wage earners and products valued at \$3,223,090, were reported as engaged in the manufacture of explosives, and at the census of 1849, 54 establishments, with 579 wage earners and products valued at \$1,590,332. Table 1 summarizes the statistics relating to this industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 1	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	86	124	97	69	54	36	-11.3	-30.6	27.8	40.6	27.8	50.0
Persons engaged in the industry.....	7,058	7,113	5,293	(²)	(²)	(²)	33.3	-0.8	34.4	-----	-----	-----
Proprietors and firm members.....	21	24	23	(²)	(²)	(²)	-8.7	-12.5	4.3	-----	-----	-----
Salaried employees.....	763	1,289	768	(²)	(²)	(²)	-0.7	-40.8	67.8	-----	-----	-----
Wage earners (average number).....	6,274	5,800	4,502	2,353	1,340	973	39.4	8.2	28.8	(²)	(²)	(²)
Primary horsepower.....	28,601	29,665	19,195	10,674	(²)	3,750	49.0	-3.6	54.5	79.8	-----	-----
Capital.....	\$50,167,976	\$42,307,163	\$19,465,846	\$13,539,478	\$6,585,185	\$4,099,900	157.7	18.6	117.3	43.8	105.6	60.6
Expenses.....	31,460,284	23,967,156	14,729,781	8,200,153	(²)	(²)	113.6	31.3	62.7	79.6	-----	-----
Services.....	5,437,976	5,105,824	3,298,203	1,549,510	675,414	594,379	64.9	6.5	54.8	112.9	129.4	13.6
Salaries.....	1,133,606	1,797,050	914,447	(²)	(²)	(²)	24.0	-36.9	96.5	-----	-----	-----
Wages.....	4,304,370	3,308,774	2,383,756	(²)	(²)	(²)	80.6	30.1	38.8	-----	-----	-----
Materials.....	22,811,548	17,203,687	10,334,974	5,481,723	3,271,549	2,398,407	120.7	32.6	66.5	88.5	67.6	36.4
Miscellaneous.....	3,210,760	1,657,665	1,096,604	1,168,920	(²)	(²)	192.8	93.7	51.2	-6.2	-----	-----
Value of products.....	40,139,661	29,602,884	17,125,418	11,352,615	5,802,029	4,237,539	134.4	35.6	72.9	50.8	95.7	36.9
Value added by manufacture (value of products less cost of materials).....	17,328,113	12,399,217	6,790,444	5,870,892	2,530,480	1,839,132	155.2	39.8	82.6	15.7	132.0	37.6

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available.
³ Figures not strictly comparable.

The value of products reported for 1909 was more than nine times the value of products in 1869, the decade 1899-1909 showing the most rapid increase. The decrease between 1904 and 1909 in the number of establishments shown is due to the fact that a larger number of individual plants operated under a common ownership were combined and reported as single establishments in 1909 than in 1904. In 1909 there were 54 plants, located in 14 states, which were reported as 16 establishments.

Comparative summary, by states.—Table 2 gives, for the three states which can be shown separately, the number of establishments, average number of wage earners, primary horsepower, capital, salaries, wages, cost of materials, value of products, and value added by manufacture for 1909, 1904, and 1899.

The three states for which comparative statistics are given show increases during the decade 1899-1909 in the more important items, such as average number of wage earners, value of products, and value added by manufacture.

The presentation of statistics by states for the manufacture of explosives is unsatisfactory, because the totals for a number of states can not be shown without the possibility of disclosing the operations of individual establishments. New Jersey, the most important state in the industry, and several other states—notably California, Wisconsin, and Missouri—are of more importance than some for which figures are given but are omitted from the table for the reason stated, while Colorado and Iowa were also of considerable importance.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	86	7,058	21	763	6,274	28,601	\$60,168	\$1,134	\$4,304	\$22,812	\$40,140	\$17,328
	1904	124	7,113	24	1,288	5,800	29,665	42,307	1,797	3,308	17,204	29,603	12,399
	1899	97	5,293	23	768	4,502	19,195	19,466	914	2,384	10,335	17,125	6,790
Illinois.....	1909	8	327	.....	37	290	1,828	1,562	44	190	935	1,469	534
	1904	5	174	.....	32	142	1,383	775	56	83	412	712	300
	1899	3	85	.....	14	71	560	493	14	32	144	290	146
Ohio.....	1909	11	424	.....	66	358	2,692	2,248	102	204	1,104	1,719	615
	1904	16	613	.....	83	428	4,075	2,868	126	236	1,275	1,843	568
	1899	9	411	.....	56	352	2,738	1,972	93	179	773	1,330	557
Pennsylvania.....	1909	27	1,225	.....	172	1,053	4,594	6,313	231	629	4,088	6,388	2,300
	1904	40	1,079	.....	163	897	5,699	6,320	233	527	2,517	4,013	1,496
	1899	36	748	.....	102	629	3,673	2,819	130	320	1,500	2,595	1,095
All other states.....	1909	40	5,082	.....	488	4,594	19,487	40,045	757	3,281	16,685	30,564	13,879
	1904	63	5,347	.....	1,011	4,333	18,508	33,344	1,382	2,463	13,000	23,035	10,035
	1899	49	4,049	.....	596	3,450	12,224	14,182	677	1,853	7,918	12,910	4,992

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex and, in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	7,058	6,787	271
Proprietors and officials.....	242	232	10
Proprietors and firm members.....	21	13	8
Salaried officers of corporations.....	66	64	2
Superintendents and managers.....	155	155	.....
Clerks.....	542	488	54
Wage earners (average number).....	6,274	6,067	207
16 years of age and over.....	6,267	6,060	207
Under 16 years of age.....	7	7	.....

The average number of persons engaged in the industry during 1909 was 7,058 of whom 6,274 or 88.9 per cent, were wage earners; 242, or 3.4 per cent, were proprietors and officials; and 542, or 7.7 per cent, were clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 6,787, or 96.2 per cent, were males and 271, or 3.8 per cent, females. The average number of wage earners under 16 years age was only seven.

Wage earners employed, by months.—Table 4 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909. The number of wage earners for the months of maximum and minimum employment are shown for several states in Table 13.

The largest number, 7,106, was reported for December, and the smallest number, 5,504, for April, the

minimum being equal to 77.5 per cent of the maximum. In 1904 the maximum number was reported for April, and the minimum number, reported for December, was equal to 95.7 per cent of the maximum.

MONTH.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	5,813	81.8
February.....	5,737	80.7
March.....	5,771	81.2
April.....	5,504	77.5
May.....	5,893	82.9
June.....	6,138	86.4
July.....	6,407	90.2
August.....	6,548	92.1
September.....	6,680	94.0
October.....	6,799	95.7
November.....	6,899	97.1
December.....	7,106	100.0

Prevailing hours of labor.—In Table 5 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

PREVAILING HOURS OF LABOR.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Average number.	Per cent of total.
Total.....	6,274	100.0
48 and under.....	216	3.4
64.....	373	5.9
Between 64 and 60.....	205	3.3
60.....	5,344	85.2
Between 60 and 72.....	136	2.2

Of the 6,274 wage earners, 5,344, or 85.2 per cent, were employed in establishments where the prevailing

hours of labor were 60 per week; 794, or 12.6 per cent, in establishments where they were less than 60 hours per week; and 136, or 2.2 per cent, in establishments where the prevailing hours were over 60 per week.

Character of ownership.—Table 6 presents statistics with respect to the character of ownership of establishments in the explosive industry.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	86	124	\$40,139,651	\$29,602,884
Individual.....	5	8	210,103	277,930
Firm.....	4	7	129,563	138,748
Corporation.....	77	109	39,799,985	29,186,206
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	5.8	6.5	0.5	0.9
Firm.....	4.7	5.6	0.3	0.5
Corporation.....	89.5	87.9	99.2	98.6

In 1909, of the total number of establishments, 89.5 per cent were under corporate ownership, as compared with 87.9 per cent in 1904. The proportions for 1909 are affected by the inclusion of a number of reports in that year which covered more than one plant, whereas in 1904 separate reports were received for each plant. The corporations reported 99.2 per cent of the value of products in 1909 and 98.6 per cent in 1904.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$31,460,284, distributed as follows: Cost of materials, \$22,811,548, or 72.5 per cent; wages, \$4,304,370, or 13.7 per cent; salaries, \$1,133,606, or 3.6 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, etc., \$3,210,760, or 10.2 per cent.

Engines and power.—The amount of power was first reported for the industry at the census of 1869. The total horsepower increased from 3,750 in 1869 to 28,601 in 1909. Table 7 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

Materials.—Table 9 shows statistics for materials used in the industry for 1909, 1904, and 1899.

The figures in Table 9 relate only to materials purchased, and do not include acids or other materials produced in establishments where they were used in further processes of manufacture.

In addition to the materials purchased by establishments manufacturing explosives as their chief product in 1909, statistics for which are given in Table

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	433	805	512	28,601	29,885	19,195	100.0	100.0	100.0
Owned.....	426	605	512	28,468	29,665	19,085	99.5	100.0	99.4
Steam.....	346	375	315	25,558	21,636	13,242	89.4	72.9	69.0
Gas.....	17	15	7	221	427	72	0.8	1.4	0.4
Water wheels.....	62	186	190	2,687	6,962	5,674	9.4	23.5	29.6
Water motors.....	1	29	(1)	2	215	(1)	(2)	0.7	.....
Other.....	.....	.....	.....	.....	425	97	.....	1.4	0.5
Rented—Electric.....	7	.....	(1)	133	.....	110	0.5	.....	0.6
Electric motors	385	428	177	14,836	7,889	2,885	100.0	100.0	100.0
Run by current generated by establishment.....	878	428	177	14,703	7,889	2,885	99.1	100.0	96.3
Run by rented power.....	7	.....	(1)	133	.....	110	0.9	.....	3.7

¹ Not reported. ² Less than one-tenth of 1 per cent.

The total primary power increased 49 per cent from 1899 to 1909, steam power increasing 93 per cent, while water power decreased 52.6 per cent. In 1899 steam power formed 69 per cent and water power 29.6 per cent of the total power, but in 1909 the corresponding proportions were 89.4 and 9.4 per cent, respectively. Rented electric power is little used in this industry, and the 133 horsepower reported in 1909 formed only five-tenths of 1 per cent of the total primary power. The horsepower of motors used for the distribution of power by means of current generated in the establishments in the industry increased from 2,885 in 1899 to 14,703 in 1909.

Fuel consumed.—Table 8 shows the amount of each kind of fuel consumed in the industry in 1909. The amount expended for fuel and rent of power and heat is shown for the few states for which statistics can be given without disclosing individual operations in Table 13.

KIND OF FUEL.	Unit.	Quantity.
Anthracite coal.....	Long tons.....	39,482
Bituminous coal.....	Short tons.....	926,700
Coke.....	Short tons.....	664
Wood.....	Cords.....	633
Oil, including gasoline.....	Barrels, 50 gallons	144,427
Gas.....	1,000 feet.....	284,797

9, 100,000 pounds of sulphuric acid, 137,400 pounds of nitric acid, and 300,140 pounds of mixed acid were used in the manufacture of explosives by establishments engaged primarily in the manufacture of other products; and 546 tons of pyrites, 619 tons of nitrate of soda, 386,000 pounds of sulphuric acid, 1,500 pounds of nitric acid, and 1,051,713 pounds of mixed acid in establishments operated by the United States Government.

MATERIAL.	1909	1904	1899
Total cost.....	\$22,811,648	\$17,203,667	\$10,334,974
Nitrate of soda:			
Tons.....	188,889	133,034	88,524
Cost.....	\$7,892,336	\$5,608,557	\$2,902,866
Acids:			
Mixed—			
Pounds.....	61,764,694	105,552,404	66,906,146
Cost.....	\$1,512,626	\$3,093,429	\$1,505,754
Nitric—			
Pounds.....	7,591,756	2,699,500	467,587
Cost.....	\$541,314	\$122,047	\$17,171
Sulphuric—			
Pounds.....	45,002,000	36,596,000	15,728,000
Cost.....	\$406,204	\$247,301	\$130,699
Sulphur or brimstone:			
Tons.....	17,389	18,570	12,742
Cost.....	\$367,866	\$501,820	\$317,383
Pyrites:			
Tons.....	36,544	12,256	(¹)
Cost.....	\$183,809	\$67,261	(¹)
All other materials.....	\$11,907,693	\$7,563,252	\$5,461,101

¹ Not reported.

In comparing statistics in regard to materials for different years the fact should not be overlooked that in addition to the materials which are purchased certain materials are also made in the establishments that used them. Table 10 shows the quantities of the most important materials which were manufactured in the establishments in which they were used in 1909 and 1904. The statistics given do not cover materials made and used in establishments engaged primarily in the manufacture of products other than explosives or in establishments operated by the Federal Government.

MATERIAL.	QUANTITY OF SPECIFIED MATERIAL PRODUCED IN ESTABLISHMENTS WHERE USED.	
	1909	1904
Potassium nitrate..... pounds	12,050,225	3,559,376
Nitroglycerin..... pounds	70,289,667	44,077,828
Sulphuric acid..... pounds	85,110,000	61,988,000
Nitric acid..... pounds	62,968,000	37,976,000
Charcoal..... bushels	737,884	1,156,918
Nitrate of ammonia..... pounds	10,904,319	2,863,857
Ether..... pounds	2,052,932	2,740,286

Products.—Table 11 shows the quantity and value of the different kinds of explosives reported by establishments engaged primarily in the manufacture of explosives in 1909, 1904, and 1899.

Including the product of the establishments operated by the Federal Government and the explosives made as secondary product by establishments not engaged primarily in the manufacture of explosives, the total production in 1909 was 489,171,650 pounds, and in 1904, 362,085,816 pounds.

The total production of smokeless powder by all classes of establishments in 1909 was 6,315,167 pounds, valued at \$4,292,984, as compared with 7,009,720 pounds, valued at \$4,406,477, in 1904, and 3,053,126 pounds, valued at \$1,716,101, in 1899.

During the decade 1899–1909 the production of explosives by establishments engaged chiefly in their manufacture increased 271,500,533 pounds, or 125.7 per cent, in quantity, and \$21,032,892, or 124.1 per cent, in value. Of the total increase in output, blast-

ing powder and gunpowder contributed 123,025,772 pounds, and dynamite, including “permissible explosives,” 118,916,843 pounds.

The production of guncotton in 1909 by all establishments was 257,212 pounds, valued at \$124,660, as compared with 383,162 pounds, valued at \$226,687, in 1904 and 848,342 pounds, valued at \$403,702, in 1899.

PRODUCT.	1909	1904	1899
Total:			
Pounds.....	1 487,481,252	2 360,880,734	215,980,719
Value.....	\$37,883,868	\$27,895,963	\$18,950,976
Dynamite:			
Pounds.....	195,155,851	130,920,829	85,846,456
Value.....	\$18,699,746	\$12,900,193	\$8,247,223
Permissible explosives:			
Pounds.....	9,607,448	(³)	(³)
Value.....	\$863,209	(³)	(³)
Nitroglycerin, sold as such:			
Pounds.....	28,913,253	7,935,936	3,618,692
Value.....	\$3,162,434	\$1,620,117	\$783,299
Blasting powder:			
Pounds.....	233,477,175	205,438,200	123,314,103
Value.....	\$9,608,265	\$7,377,977	\$5,310,351
Gunpowder:			
Pounds.....	12,862,700	10,383,944	
Value.....	\$1,736,427	\$1,541,483	
Other explosives, including smokeless powder and guncotton or pyroxylin, sold as such:			
Pounds.....	1 7,464,825	2 6,303,825	3,201,468
Value.....	\$3,913,787	\$4,256,193	\$2,610,103

¹ In addition, 1,471,042 pounds of “other explosives,” valued at \$658,969, were made by Federal establishments, and 219,356 pounds, valued at \$135,979, by establishments not engaged primarily in the manufacture of explosives.

² In addition, 1,105,082 pounds, valued at \$567,804, were made by Federal establishments and establishments not engaged primarily in the manufacture of explosives.

³ Not reported separately.

⁴ Includes the value of explosives for which no quantities were reported, as follows: In 1904, \$150,798, and in 1899, \$850,453.

From 1904 to 1909 the production of nitroglycerin sold as such increased 20,977,317 pounds, or 264.3 per cent, in quantity, and \$1,542,317, or 95.2 per cent, in value. The larger part of the nitroglycerin manufactured, however, was used in the manufacture of dynamite and similar explosives in the establishments where it was produced (see Table 10), 70.9 per cent being so used in 1909, and 84.7 per cent in 1904.

Explosives which are intended for use in coal mines where there are inflammable gases and which have passed the prescribed tests of the United States Bureau of Mines are designated as “permissible explosives.” These explosives were reported separately for the first time at the census of 1909. Generally they are similar in composition to dynamite, and such quantities as were manufactured in 1904 and 1899 were reported as dynamite. The aggregate production of dynamite and permissible explosives in 1909 by establishments engaged primarily in the industry was 204,763,299 pounds, valued at \$19,562,955, as compared with 130,920,829 pounds, valued at \$12,900,193, in 1904 and 85,846,456 pounds, valued at \$8,247,223, in 1899, an increase for the decade of 138.5 per cent in quantity and 137.2 per cent in value.

In 1909, 44 establishments reported the manufacture of nitroglycerin, 25 the manufacture of dynamite, and 13 the manufacture of permissible explosives.

Table 12 shows the quantity of gunpowder and of blasting powder produced by establishments in the industry in 1909, 1904, and 1899.

The production of gunpowder and blasting powder in 1909 aggregated 246,339,875 pounds, valued at \$11,344,692, as compared with 215,820,144 pounds, valued at \$8,919,460, in 1904 and 123,314,103 pounds, valued at \$5,310,351, in 1899. The manufacture of blasting powder was reported by 38 establishments in 1909, and that of gunpowder by 8 establishments.

Recovered acid constitutes an important by-product in the manufacture of explosives. In 1909 the commercial establishments engaged primarily in the industry reported the recovery of 14,137,857 pounds of acid, valued at \$62,935, and the establishments oper-

ated by the Federal Government reported the recovery of 1,610,646 pounds.

PRODUCT.	GUNPOWDER AND BLASTING POWDER PRODUCED (POUNDS).		
	1909	1904	1899
Total.....	246,339,875	215,820,144	123,314,103
Gunpowder.....	12,862,700	10,383,944	(1)
Blasting powder.....	233,477,175	205,436,200	(1)
Per cent of total.....	100.0	100.0	.....
Gunpowder.....	5.2	4.8	.....
Blasting powder.....	94.8	95.2	.....

¹ Figures not strictly comparable.

DETAILED STATE TABLE.

The principal statistics secured by the census inquiry concerning the manufacture of explosives are presented, by states, in Table 13, which gives detailed figures for 1909 for number of establishments,

number of persons engaged in the industry, number of wage earners on December 15, or the nearest representative day, primary horsepower, capital, expenses, value of products, and value added by manufacture.

EXPLOSIVES—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.		
		Total.	Pro-prietors and firm members.	Salaried officers, super-intend-ents, and man-agers.	Clerks.		Wage earners.			Total.	16 and over.			Under 16.	
					Male.	Fe-male.	Average number.	Number, 15th day of—			Male.	Fe-male.		Male.	Fe-male.
								Maximum month.	Minimum month.						
United States.....	38	7,058	21	221	488	54	8,274	De 7,108	Ap 5,504	7,121	6,878	235	8	28,601	
Illinois.....	8	327	.....	15	15	7	290	De 326	Ap 251	326	326	.....	.....	1,828
Ohio.....	11	424	.....	24	34	8	358	Au 385	Ap 323	378	355	23	.....	2,692
Pennsylvania.....	27	1,225	20	59	97	16	1,033	Se 1,159	Mh 906	1,111	1,002	101	8	4,594	
All other states ¹	40	5,082	1	123	342	23	4,593	.....	.....	5,306	5,195	111	.....	19,487

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manu-facture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, includ-ing internal revenue.	Con-tract work.	Other.		
United States.....	\$50,167,976	\$31,460,284	\$518,080	\$615,526	\$4,304,370	\$826,981	\$21,984,567	\$4,600	\$142,062	\$3,065	\$3,061,033	\$40,139,661	\$17,328,113
Illinois.....	1,561,612	1,250,894	28,630	15,190	189,558	29,226	906,066	150	4,414	1,503	76,157	1,469,469	534,177
Ohio.....	2,247,776	1,585,825	66,668	35,586	203,782	40,997	1,062,874	460	14,799	.....	160,659	1,718,871	615,000
Pennsylvania.....	6,313,397	5,479,440	119,973	111,357	629,643	84,786	4,002,780	2,485	21,008	127	507,281	6,387,869	2,300,303
All other states ¹	40,045,191	23,144,125	302,809	453,393	3,281,387	671,972	16,012,847	1,505	101,841	1,435	2,316,936	30,563,452	13,878,633

¹ All other states embrace: Alabama, 2 establishments; Arkansas, 1; California, 2; Colorado, 1; Connecticut, 1; Delaware, 1; Indiana, 3; Iowa, 1; Kansas, 2; Maryland, 1; Massachusetts, 2; Michigan, 3; Missouri, 3; New Jersey, 2; New York, 3; Oklahoma, 3; Tennessee, 2; Texas, 1; Washington, 2; West Virginia, 3; Wisconsin, 1.

FERTILIZERS

THE FERTILIZER INDUSTRY.

GENERAL STATISTICS.

Scope of industry.—This classification covers establishments making artificial fertilizers, the products being ordinarily ready for use without being subjected to further treatment. The production of certain kinds of products which are used more or less extensively for fertilizing without special manufacture is not covered by this report. For example, the production of raw phosphate rock, including the process of grinding it, is treated as a mining industry, and, while part of the phosphate rock is used as material by fertilizer factories, a great deal of it is used directly as such on the farms. Crude cottonseed, a farm product, is often used as a fertilizer without being subjected to any manufacturing process, and cottonseed meal and other products of cottonseed-oil mills are also so used. Tankage, which consists of various waste materials of slaughtering and meat-packing establishments, is also used to a considerable extent as a fertilizer without further preparation. Much cottonseed meal and tankage, however, are used as materials by the fertilizer factories included under the present classification.

The raw materials used by fertilizer factories include animal, vegetable, and mineral products, while sulphuric and other acids are employed extensively in the treatment of the basic materials. The finished products include a variety of classes, such as "complete" fertilizers, which consist of a mixture of super-

phosphates with both potash and ammoniates, superphosphates with or without ammoniates, concentrated phosphates, and other minor classes.

In addition to the production of fertilizers by establishments assigned to the present classification, there is a considerable production of similar finished fertilizers by concerns engaged primarily in the manufacture of other products, especially by slaughtering and meat-packing establishments and cottonseed-oil mills. In cases where the manufacture of fertilizers by concerns of this character was conducted as a separate department a separate report for this department was secured, and the statistics are included with those for the fertilizer industry, while in other cases separate reports were not secured, since the statistics of capital, labor, etc., for this branch of the business could not be segregated. As a rule, however, the quantity and value of the fertilizers produced and the quantity and cost of the fertilizer materials used by such establishments were given, making it possible to present more complete statistics for these items.

Summary and comparison with earlier censuses.—Table 1 summarizes the statistics for the fertilizer industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 1	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904 ²	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	550	399	422	390	364	126	30.3	37.8	-5.5	8.2	7.1	188.9
Persons engaged in the industry.....	21,950	16,091	13,654	(³)	(³)	(³)	60.8	36.4	17.9	.....	.....	.....
Proprietors and firm members.....	323	294	361	(³)	(³)	(³)	-10.5	9.9	-18.6	.....	.....	.....
Salariated employees.....	3,317	1,613	1,712	(³)	(³)	(³)	93.8	105.6	-5.8	.....	.....	.....
Wage earners (average number).....	18,310	14,184	11,581	9,026	8,598	2,501	58.1	29.1	22.5	(⁴)	(⁴)	(⁴)
Primary horsepower.....	64,711	47,989	38,680	(³)	(³)	2,951	67.3	34.8	24.1	.....	.....	.....
Capital.....	\$121,537,451	\$68,917,264	\$60,685,753	\$40,594,168	\$17,913,660	\$4,395,948	100.3	76.4	13.6	49.5	126.6	307.5
Expenses.....	90,101,293	51,264,749	39,003,019	32,575,787	(³)	(³)	131.0	75.8	31.4	19.7	.....	.....
Services.....	11,882,815	7,061,139	6,310,261	4,671,831	2,648,422	766,712	88.3	68.3	11.9	35.1	76.4	245.4
Salaries.....	4,405,636	1,933,992	2,124,972	(³)	(³)	(³)	107.3	127.8	-9.0	.....	.....	.....
Wages.....	7,477,179	5,127,147	4,185,289	(³)	(³)	(³)	78.7	45.8	22.5	.....	.....	.....
Materials.....	69,521,920	39,287,914	28,958,473	25,113,874	15,595,078	3,808,025	140.1	77.0	35.7	15.3	61.0	309.5
Miscellaneous.....	8,696,558	4,915,696	3,734,285	2,790,082	(³)	(³)	132.9	76.9	31.6	33.8	.....	.....
Value of products.....	103,960,213	56,541,253	44,657,385	39,180,844	23,650,795	5,815,118	132.8	83.9	26.6	14.0	65.7	306.7
Value added by manufacture (value of products less cost of materials).....	34,438,293	17,253,339	15,698,912	14,066,970	8,055,717	2,007,093	119.4	99.6	9.9	11.6	74.6	301.4

¹ A minus sign (-) denotes decrease. Where percentages are omitted comparable figures are not available.

² Exclusive of the statistics for Alaska, which were included in the totals published at the census of 1904.

³ Comparable figures not available.

⁴ Figures not strictly comparable.

In 1859, statistics for which are not included in the table, 47 establishments were reported as making fertilizers, with 308 wage earners and products valued at \$891,344. The growth of the industry from census to census has been continuous and for the most part rapid, the value of products reported for 1909 being nearly eighteen times as great as that for 1869. Be-

tween 1899 and 1909 the value of products increased 132.8 per cent, the number of wage earners 58.1 per cent, the amount paid in wages 78.7 per cent, and the value added by manufacture 119.4 per cent. The growth of the industry was greater during this decade than in any other decade covered by the table, except that from 1869 to 1879.

Summary, by states.—Table 2 summarizes the more important statistics for the fertilizer industry, by states, the states being arranged according to the value of products reported for 1909. The states

shown in this table are given their actual ranking among all states, the rank of certain states for which data can not be presented being higher than that of some named in the table.

STATE.	Number of establishments, 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Wage earners.			Value of products.			Value added by manufacture.		
											1909	1904	1899	1904	1899	1904	1899	1904	1899
		1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	
United States....	550	18,310	100.0	.....	\$103,860,213	100.0	.....	\$34,433,293	100.0	.....	58.1	29.1	22.5	132.8	83.9	28.5	119.4	99.6	9.8
Georgia.....	110	2,770	15.1	1 1	16,800,301	16.2	1 1	5,856,150	17.0	1 1	146.0	26.4	94.7	399.0	77.6	181.0	475.8	99.6	188.5
Maryland.....	41	1,439	7.9	3 3	9,672,786	9.3	2 2	2,710,061	7.9	3 3	41.6	14.6	23.6	76.5	45.9	21.0	47.4	65.2	-10.8
South Carolina.....	26	1,851	10.1	4 5	9,024,900	8.7	3 6	3,395,442	9.9	2 7	4.5	72.8	-39.6	84.8	148.1	-25.5	91.3	259.0	-46.7
Virginia.....	45	1,956	10.7	2 2	8,034,543	7.7	4 4	2,645,433	7.7	4 4	67.0	8.6	53.8	135.2	72.5	36.4	116.8	86.6	13.0
New Jersey.....	22	1,208	6.6	7 -4	7,671,859	7.4	5 3	1,986,672	5.8	7 2	25.6	6.1	18.4	78.8	35.7	31.7	73.5	15.3	50.6
Pennsylvania.....	48	1,224	6.7	6 6	6,542,844	6.3	6 5	1,929,974	5.6	8 5	60.0	27.8	25.2	79.6	59.8	12.4	82.1	60.3	13.6
Alabama.....	42	1,233	6.7	5 10	6,423,233	6.2	7 9	2,158,865	6.3	5 11	180.9	123.8	25.5	210.6	174.4	13.2	217.0	193.7	7.9
North Carolina.....	34	933	5.1	8 7	6,316,485	6.1	8 7	2,133,282	6.2	6 9	118.5	2.8	112.6	321.6	103.8	106.9	369.8	142.1	94.1
Ohio.....	27	841	4.6	10 11	4,434,541	4.3	9 10	1,899,756	5.5	9 8	110.2	71.6	22.5	167.6	93.8	38.1	196.9	110.4	41.1
New York.....	12	908	5.0	9 9	4,250,568	4.1	10 11	1,595,801	4.6	10 10	-12.1	52.3	-42.3	35.0	104.2	-33.9	28.8	113.4	-39.6
Florida.....	15	589	3.2	11 16	3,878,296	3.7	11 13	1,003,679	2.9	13 16	403.4	143.4	106.8	675.6	143.9	218.0	493.5	278.5	56.8
Tennessee.....	12	559	3.1	12 8	3,249,343	3.2	13 8	1,127,615	3.3	12 6	26.2	-28.4	76.3	121.6	20.3	84.2	66.7	14.0	46.3
Illinois.....	11	444	2.4	15 23	2,385,951	2.3	14 22	961,434	2.8	14 22	31.8	.....	-85.8	28.6	1,721.4	-92.9	13.2	.....	-95.3
California.....	15	226	1.2	18 19	2,312,555	2.2	15 17	516,777	1.5	16 15	.....	83.7	.....	244.7	158.7	33.2	175.0	37.9	99.5
Mississippi.....	10	449	2.5	13 13	2,125,029	2.0	16 15	740,071	2.1	15 17	.....	29.0	.....	331.0	96.4	119.5	390.1	228.9	49.0
Louisiana.....	6	295	1.6	16 14	1,757,091	1.7	17 14	432,613	1.2	18 13	6.1	-14.2	23.7	93.1	12.9	71.0	46.3	-20.1	83.1
Connecticut.....	12	295	1.6	17 15	1,572,575	1.5	18 16	481,514	1.4	17 14	121.8	-4.8	133.1	302.3	66.8	141.2	195.7	15.3	156.4
Delaware.....	10	134	0.7	19 18	859,517	0.8	19 19	407,530	1.2	19 19	-9.5	-10.1	0.7	16.4	13.2	-49.8	20.4	.....	-75.2
Maine.....	5	95	0.5	22 24	596,623	0.6	21 24	165,787	0.5	23 24	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indiana.....	15	123	0.7	20 20	456,362	0.4	23 21	202,608	0.6	22 18	.....	.....	.....	78.8	52.5	17.3	.....	41.3	.....
All other states.....	32	738	4.0	.....	5,594,811	5.4	.....	2,087,226	6.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages of increase are based on figures in Table 19. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture.

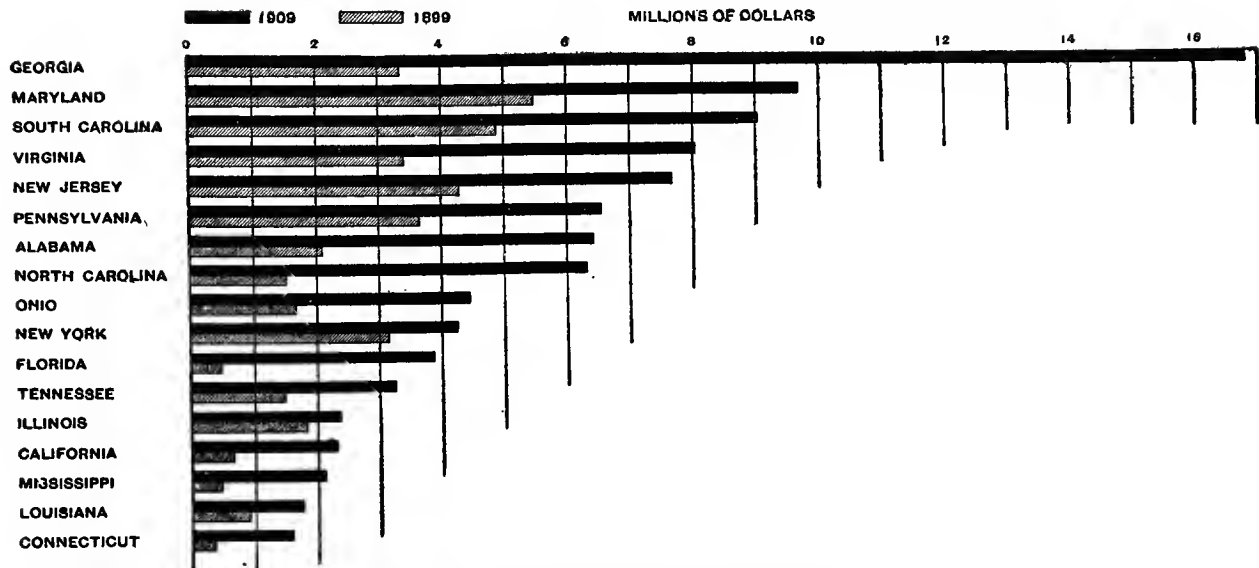
Although reported from 34 states, the industry is largely concentrated in the Southern states, the states of the South Atlantic division alone reporting more than half of the total value of products in 1909. In this connection it may be noted that, according to the census of agriculture, much the larger part of the expenditure of farmers for fertilizers is in the South. In 1909 the farmers of the United States reported the expenditure of \$114,882,541 for fertilizers, of which \$75,752,296, or 65.9 per cent, was spent by the farmers of the South. The farmers of the South Atlantic division alone spent \$59,625,130, or more than half of the total. Most of the expenditure for fertilizers outside of the South was reported from the three northeastern divisions of the country—the New England, Middle Atlantic, and East North Central.

Georgia is by far the most important state in the production of fertilizers, the value of its product in 1909 representing nearly one-sixth of the total for the country. Maryland ranks second among the states in value of products of the fertilizer industry. Florida, one of the important states in this industry, shows the

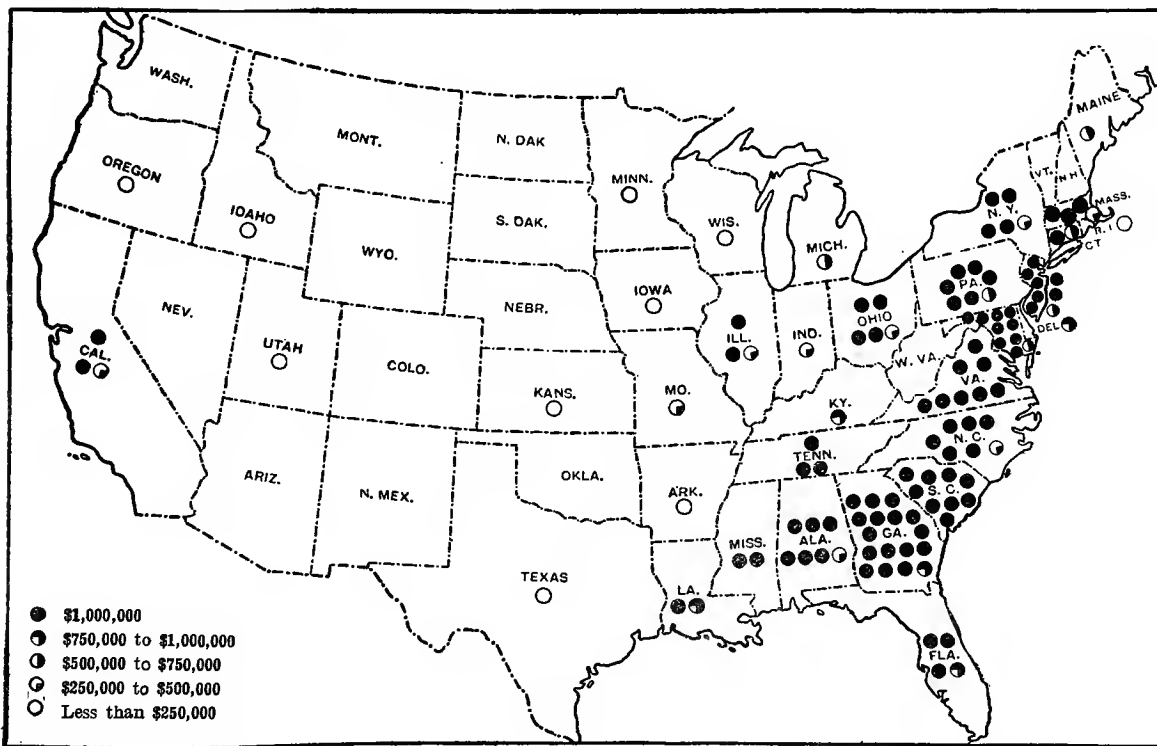
greatest rate of increase in value of products between 1899 and 1909, 675.6 per cent. In Georgia the increase was 399 per cent, and in Virginia, Alabama, North Carolina, Ohio, Tennessee, Mississippi, and Connecticut the rate of increase exceeded 100 per cent. Although the percentage of increase during the decade was less conspicuous for South Carolina, this state advanced from sixth place in value of products in 1904 to third place in 1909. The increase shown for Illinois from 1904 to 1909 has little significance, as the fertilizer business of certain establishments making fertilizers as a subsidiary product was classed with the fertilizer industry in 1899 and 1909 but not in 1904. The figures for other states also may have been affected by changes in the method of reporting the manufacture of fertilizers by concerns primarily engaged in other industries.

The following diagram shows graphically the value of products for the most important states in the industry in 1909 and 1899, while the map shows graphically the distribution, by states, of the value of products in 1909.

VALUE OF PRODUCTS FOR LEADING STATES: 1909 AND 1899.



VALUE OF PRODUCTS, BY STATES: 1909.



Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the industry during 1909 was 21,950, of whom 18,310, or 83.4 per cent, were wage earners, 1,323, or 6 per cent, proprietors and officials, and 2,317, or 10.6 per cent, clerks, this class including other subordinate salaried

employees. Of the total number of persons engaged in the industry, 21,547, or 98.2 per cent, were males, and 403, or 1.8 per cent, females, most of the latter being clerks. The average number of wage earners under 16 years of age (all of whom were males) was only 67.

The average number of wage earners for each state in 1909, 1904, and 1899 is given in Table 19. The distribution of the average number by sex and age is not shown for the individual states, but Table 20 gives such a distribution of the number of wage earners employed on the representative day. No women were reported as wage earners in 12 of the 22

states for which separate figures are shown. The largest number of female wage earners, 47, was reported for the state of Illinois, and the next largest, 20, for Connecticut. More than one-half of the boys under 16 years of age were reported from Georgia.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes	21,950	21,547	403
Proprietors and officials	1,323	1,313	10
Proprietors and firm members	323	316	7
Salaried officers of corporations	406	404	2
Superintendents and managers	594	593	1
Clerks	2,317	2,042	275
Wage earners (average number)	18,310	18,192	118
16 years of age and over	18,243	18,125	118
Under 16 years of age	67	67	.....

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904 it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total	21,950	100.0	18,091	100.0	36.4
Proprietors and firm members	323	1.5	294	1.8	9.9
Salaried employees	3,317	15.1	1,613	10.0	105.6
Wage earners (average number)	18,310	83.4	14,184	88.1	29.1

Table 5 shows the average number of wage earners in the industry, distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899. The number of women and children employed was so small that the increase from 1899 to 1909 has little significance.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total	18,310	100.0	14,184	100.0	11,581	100.0
16 years of age and over	18,243	99.6	14,158	99.8	11,566	99.9
Male	18,125	99.0	14,048	99.0	11,435	98.7
Female	118	0.6	110	0.8	131	1.1
Under 16 years of age	67	0.4	26	0.2	15	0.1

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909, for the 12 states in which an average of 500 or more wage earners were employed during the year.

The industry is considerably affected by the seasonal demand for fertilizers. The largest number of wage earners employed during any month of 1909 was 29,310 in March, and the smallest number 14,264 in July, the minimum number being equal to 48.7 per cent of the maximum. In 1904 the maximum number, 20,834, was shown for March, and the minimum number, 11,122, for June, the latter number forming 53.4 per cent of the former. In the more southern states—Alabama, Florida, Georgia, and South Carolina—the month of maximum employment was February or March and that of minimum employment July or August, and there was no marked renewal of activity in the fall, but rather a general increase in number employed from the month of minimum employment to the end of the year. In some of the other states, however, there were periods of considerable activity both in the spring and in the late summer, and in Maryland, New York, Ohio, and Virginia the maximum employment was in August or September.

The months of maximum and minimum employment in 1909, and the number of wage earners reported for these months, are given for a larger number of states in Table 21.

STATE.	Average number during the year.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909 ¹											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	18,310	17,076	24,196	29,310	23,198	16,737	14,506	14,264	15,514	18,163	16,232	15,005	15,425
Alabama	1,233	1,446	2,316	2,785	1,844	1,083	771	667	<i>658</i>	793	700	821	911
Florida	589	702	820	705	518	506	494	471	472	522	556	559	654
Georgia	2,770	3,006	5,619	6,851	3,697	2,003	1,392	<i>1,366</i>	1,402	1,679	1,904	2,076	2,240
Maryland	1,439	1,185	1,403	1,688	1,833	1,380	1,210	1,331	1,499	2,115	1,337	<i>1,110</i>	1,178
New Jersey	1,208	<i>1,086</i>	1,109	1,518	1,482	1,153	1,112	1,138	1,173	1,216	1,196	1,164	1,143
New York	908	771	809	908	946	857	897	1,089	1,143	1,110	988	671	709
North Carolina	933	686	1,227	1,642	1,684	879	743	<i>494</i>	644	817	954	672	744
Ohio	841	692	676	779	826	749	742	775	1,129	1,522	789	716	697
Pennsylvania	1,224	1,161	1,270	1,451	1,473	1,190	<i>1,109</i>	1,140	1,235	1,250	1,126	1,112	1,171
South Carolina	1,851	1,875	3,389	4,356	2,352	1,323	1,069	<i>922</i>	1,030	1,176	1,477	1,462	1,779
Tennessee	559	503	745	683	823	438	372	408	406	550	567	480	522
Virginia	1,956	1,221	1,579	1,926	2,388	2,492	2,199	2,130	2,166	2,517	2,065	1,757	<i>1,087</i>

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

Prevailing hours of labor.—In Table 7 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total, according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

in establishments where the usual hours were less than 54 per week. In the industry as a whole, 14,502 wage earners, or 79.2 per cent of the total, were employed in establishments operating 60 hours per week, and this was the most common time of employment in every state for which data are shown in the table.

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of the establishments in the fertilizer industry.

Table 7

AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
		United States.....	18,310	51	22	332	806	14,502	1,408	1,189
Alabama.....	1,233	4		16		997	175	41
Florida.....	589				12	562	15	
Georgia.....	2,770	4	7	7	159	2,146	87	360
Maryland.....	1,439		3	30		1,030	376	
New Jersey.....	1,208	9		11	51	1,137		
New York.....	908	11			1	578	258	60
North Carolina.....	933			2	70	686	36	139
Ohio.....	841			60	26	755		
Pennsylvania.....	1,224	6	8		197	425	169	419
South Carolina.....	1,851			4		1,798	6	43
Tennessee.....	559	1			46	512		
Virginia.....	1,956	4	3	14	108	1,465	255	107

More than nine-tenths (93.4 per cent) of the wage earners employed in the industry in 1909 worked in establishments where the prevailing hours were 60 or more per week. Less than 1 per cent were employed

Table 8

NUMBER OF ESTABLISHMENTS. VALUE OF PRODUCTS.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	550	389	\$103,960,213	\$56,541,253
Individual.....	95	99	1,907,199	1,809,406
Firm.....	86	73	4,046,342	3,409,295
Corporation.....	369	227	98,006,672	51,322,552
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	17.3	24.8	1.8	3.2
Firm.....	15.6	18.2	3.9	6.0
Corporation.....	67.1	57.0	94.3	90.8

In 1909, of the total number of establishments reported for the industry, 67.1 per cent were under corporate ownership, as compared with 57 per cent in 1904. In 1909 the value of products of these establishments represented 94.3 per cent of the total, and in 1904, 90.8 per cent.

Table 9 gives statistics for establishments classified according to form of ownership for the 12 states employing an average of more than 500 wage earners in 1909. The table shows that in every state listed corporations controlled the great bulk of the business.

Table 9

NUMBER OF ESTABLISHMENTS OWNED BY— WAGE EARNERS IN ESTABLISHMENTS OWNED BY— VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY— VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	95	86	369	354	790	17,166	\$1,907,189	\$4,046,342	\$98,006,672	\$512,731	\$1,271,246	\$32,654,316
Alabama.....	2	4	36	(X)	27	1,206	(X)	268,840	6,154,393	(X)	57,177	2,121,691
Florida.....			12			589		3,878,296				1,003,679
Georgia.....	11	21	78	36	262	2,472	284,545	1,376,817	15,138,939	50,068	504,563	5,301,519
Maryland.....	10	10	21	55	61	1,323	392,939	222,175	9,057,672	97,138	75,500	2,537,423
New Jersey.....	5	6	11	18	53	1,137	104,890	180,535	7,386,734	18,776	70,140	1,897,756
New York.....	4	1	10	18	(X)	890	129,221	(X)	4,121,284	31,600	(X)	1,564,201
North Carolina.....	6	6	22	22	38	873	59,123	141,881	6,115,481	31,008	58,384	2,043,890
Ohio.....	4	4	19	13	12	816	41,245	84,200	4,309,096	19,716	21,461	1,858,559
Pennsylvania.....	22	12	14	65	110	1,049	312,432	561,916	5,668,496	97,295	116,367	1,716,312
South Carolina.....		1	25	(X)	(X)	1,851		(X)	9,024,900		(X)	3,396,442
Tennessee.....	1	3	8	(X)	20	539	(X)	72,182	3,177,161	(X)	17,100	1,110,515
Virginia.....	6	2	37	147	(X)	1,809	327,941	(X)	7,706,602	161,486	(X)	2,483,947

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

Size of establishments.—Table 10 presents statistics reported for 1909 and 1904 for establishments in the fertilizer industry grouped according to the value of their products.

In 1909, 1.8 per cent of the establishments manufactured products valued at \$1,000,000 or over, as against 1.5 per cent in 1904. These establishments reported 16.6 per cent of the value of products in 1909 and 15.6 per cent in 1904. By far the greater part

of the value of products of the industry, 73.8 per cent in 1909 and 70.5 per cent in 1904, was reported by establishments having products valued at \$100,000 but less than \$1,000,000 each.

The average number of wage earners per establishment decreased from 36 in 1904 to 33 in 1909, but the average value of products per establishment increased from \$141,707 to \$189,019, and the average value added by manufacture from \$43,241 to \$62,615.

Table 10

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	550	399	\$103,960,213	\$56,541,253
Less than \$5,000.....	54	46	134,901	126,587
\$5,000 and less than \$20,000.....	95	87	1,103,092	1,007,796
\$20,000 and less than \$100,000.....	180	131	8,668,288	6,643,941
\$100,000 and less than \$1,000,000.....	211	129	76,746,170	39,909,070
\$1,000,000 and over.....	10	6	17,307,782	8,853,859
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	9.8	11.5	0.1	0.2
\$5,000 and less than \$20,000.....	17.3	21.8	1.1	1.8
\$20,000 and less than \$100,000.....	32.7	32.8	8.3	11.8
\$100,000 and less than \$1,000,000.....	38.4	32.3	73.8	70.6
\$1,000,000 and over.....	1.8	1.5	16.6	15.7

Table 11 classifies the establishments in 12 of the leading states according to the number of wage earners employed. It should be borne in mind that, because of the seasonal character of the industry, the average number of employees in any given establishment for the entire year is usually much less than the number employed during the busy months.

Of the 550 establishments reported in 1909, 2 per cent employed no wage earners, 38.2 per cent employed from 1 to 5, 24.2 per cent from 6 to 20, 27.1 per cent from 21 to 100, and 8.5 per cent more than 100 wage earners.

Table 11

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—												
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		Over 250 wage earners.
	Estab-lish-ments.	Wage earners (average number).	Estab-lish-ments.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.....	550	18,310	11	210	583	133	1,411	73	2,585	78	5,530	39	5,697	8	2,515
Alabama.....	42	1,233	.....	16	58	11	88	5	163	7	532	3	392	.....	.....
Florida.....	12	589	.....	2	8	3	39	2	59	4	303	1	180	.....	.....
Georgia.....	110	2,770	1	49	149	27	282	14	507	14	1,093	5	759	.....	.....
Maryland.....	41	1,439	.....	21	52	7	87	4	150	5	354	3	447	1	349
New Jersey.....	22	1,208	.....	9	19	5	65	2	66	.....	.....	3	452	2	606
New York.....	15	908	2	4	5	3	37	1	44	2	149	2	304	1	369
North Carolina.....	34	933	.....	11	30	11	127	4	144	7	494	1	138	.....	.....
Ohio.....	27	841	2	9	30	7	66	2	83	4	288	3	374	.....	.....
Pennsylvania.....	48	1,224	1	28	66	11	110	2	75	3	254	2	300	1	419
South Carolina.....	26	1,851	.....	6	23	3	35	2	63	8	599	7	1,131	.....	.....
Tennessee.....	12	1,559	.....	4	11	1	13	2	96	3	192	2	247	.....	.....
Virginia.....	45	1,956	.....	10	20	11	135	9	332	10	676	4	541	1	252

Of the total number of wage earners reported, 10.9 per cent were reported by establishments employing on the average from 1 to 20; 14 per cent by establishments employing from 21 to 50; 30.3 per cent by establishments employing from 51 to 100; and 44.8 per cent by establishments employing more than 100 wage earners. There were no establishments in the industry employing an average of more than 500 wage earners during the year.

Expenses.—As stated in the Introduction, the census does not purport to furnish figures that can be used for determining the total cost of manufacture, since they take no account of interest or depreciation, and hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported.

Table 1 shows the total expenses in 1909 to have been \$90,101,293, distributed as follows: Cost of materials, \$69,521,920, or 77.2 per cent; wages, \$7,477,179, or 8.3 per cent; salaries, \$4,405,636, or 4.9 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$8,696,558, or 9.7 per cent.

Engines and power.—As shown in Table 1 the amount of power used in the fertilizer industry increased from 2,951 horsepower in 1869 to 64,711 in 1909. Table 12 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

Table 12

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	1,338	830	637	64,711	47,989	38,880	100.0	100.0	100.0
Owned.....	900	752	637	51,967	45,456	37,980	80.3	94.7	98.2
Steam.....	804	720	591	49,740	44,672	37,121	76.9	93.1	96.0
Gas.....	83	17	30	1,825	246	410	2.8	0.5	1.1
Water wheels.....	10	15	16	300	353	359	0.5	0.7	0.9
Water motors.....	3	.....	.....	65	.....	.....	0.1	.....	.....
Other.....	.....	.....	.....	37	185	90	0.1	0.4	0.2
Rented.....	438	78	(1)	12,744	2,533	700	19.7	6.3	1.8
Electric.....	438	78	(1)	12,579	2,358	220	19.4	4.9	0.6
Other.....	.....	.....	.....	165	175	480	0.3	0.4	1.2
Electric motors.....	761	204	36	19,238	5,275	1,061	100.0	100.0	100.0
Run by current generated by establishment.....	323	126	36	6,659	2,917	841	34.6	55.3	79.3
Run by rented power.....	438	78	(1)	12,579	2,358	220	65.4	44.7	20.7

(1) Not reported.

The total primary power of the fertilizer factories increased from 38,680 horsepower in 1899 to 64,711 in 1909, or 67.3 per cent. The greater part of the increase was in steam power and rented electric power. In 1899 steam power formed 96 per cent of the total primary power, but in 1909 it formed only 76.9 per cent. The horsepower of electric motors operated by current generated in the establishments reporting increased from 841 in 1899 to 6,659 in 1909.

Table 13 shows, for 1909, the statistics of power and of the different kinds of fuel used in the fertilizer works in 12 of the leading states.

The largest amount of steam power, gas-engine power, and rented electric power was reported for Georgia. Rented electric power was reported for all the states listed, and formed more than one-third of the total primary power in Alabama, Georgia, and New York.

STATE.	PRIMARY HORSEPOWER.		OWNED BY ESTABLISHMENTS REPORTING.						RENTED.		ELECTRIC HORSEPOWER.		FUEL USED.				
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Elec- tric.	Other.	Total, rented and generated by estab- lish- ment.	Gen- erated in the estab- lish- ment report- ing.	Coal.		Coke (short tons).	Wood (cords).	Oil, in- cluding gasoline (bar- rels).	Gas (1,000 feet).
												Anthra- cite (long tons).	Bitumi- nous (short tons).				
United States.....	485	64,711	51,867	49,740	1,825	365	37	12,579	185	19,238	6,659	20,698	462,023	6,148	9,795	19,721	111,859
Alabama.....	42	4,484	2,845	2,745	73	.....	27	1,614	25	1,684	70	.....	33,549	.....	420	85	.....
Florida.....	12	1,710	1,365	970	395	.....	.....	345	.....	1,279	934	290	4,956	.....	702	.....	.....
Georgia.....	91	10,488	6,493	5,893	600	.....	.....	3,995	.....	4,577	682	.....	43,977	25	4,333	377	848
Maryland.....	30	5,324	4,224	4,090	84	50	.....	1,100	.....	1,383	283	.....	25,183	10	10	61	150
New Jersey.....	18	2,459	2,459	2,424	35	.....	.....	.....	.....	1,368	1,368	11,479	30,304	.....	10	50	7
New York.....	14	2,799	1,650	1,625	25	.....	.....	1,039	110	1,114	75	2,177	18,645	4,507	.....	.....	.....
North Carolina.....	32	3,132	2,597	2,537	60	.....	.....	535	.....	547	12	.....	19,220	.....	1,270	74	.....
Ohio.....	24	3,059	2,819	2,689	130	.....	.....	240	.....	585	345	.....	34,111	.....	50	.....	11,306
Pennsylvania.....	46	5,174	4,967	4,852	10	105	.....	177	30	981	804	4,701	55,930	583	.....	17	.....
South Carolina.....	26	4,768	4,379	4,338	41	.....	.....	387	.....	607	220	.....	45,046	.....	986	27	.....
Tennessee.....	10	2,152	1,799	1,799	.....	.....	.....	353	.....	629	276	.....	16,160	1,000	12	48	.....
Virginia.....	38	5,560	5,335	5,228	72	35	.....	225	.....	573	348	1,937	49,289	.....	283	37	.....
All other states.....	102	13,604	11,035	10,550	300	176	10	2,569	.....	3,911	1,342	.....	85,653	23	1,719	18,945	99,548

Fuel consumed.—The expenditures for fuel and rent of power in 1909 amounted to \$1,452,809, this item being distributed by states in Table 20. Bituminous

coal was by far the principal kind of fuel used, 462,023 tons being consumed during 1909. Anthracite coal was used to a considerable extent in New Jersey.

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

Materials used by establishments in the fertilizer industry.—Table 14 shows the statistics of the materials used in the fertilizer industry for 1909, 1904, and 1899.

As judged by the amount expended for them, ammoniates, animal and vegetable, were in 1909 the most important materials, followed by phosphate rock, potash salts, superphosphates, nitrate of soda, ammonium sulphate, sulphuric acid, fish, pyrites, and kainit, in the order named.

The cost of the materials named specifically in the table aggregated \$55,360,423 in 1909, \$28,975,713 in 1904, and \$23,454,126 in 1899. Of these totals, the cost of ammoniates formed 29 per cent in 1909 as compared with 34.2 per cent in 1904 and 42.4 per cent in 1899. The cost of phosphate rock shows only slight changes in its proportion of the total; it constituted 15.6 per cent of the total of the materials shown separately in 1909, 14.6 per cent in 1904, and 15.2 per cent in 1899. The cost of potash salts represented 13.2 per cent, 12.4 per cent, and 13.2 per cent of the respective totals, and the aggregate cost of sulphuric acid, pyrites, and sulphur constituted 11.2 per cent of the total in 1909, 11 per cent in 1904, and 13.2 per cent in 1899.

Table 15, on the next page, shows for 1909 statistics regarding the consumption of sulphuric acid in the fertilizer industry in 10 of the leading states.

MATERIAL.	1909	1904	1899
Total cost.....	\$69,521,820	\$39,287,914	\$28,958,473
Ammoniates:			
Tons.....	778,639	(1)	(1)
Cost.....	\$16,965,978	\$9,915,648	\$9,934,145
Ammonium sulphate:			
Tons.....	63,381	10,540	4,120
Cost.....	\$3,640,592	\$600,856	\$186,609
Kainit:			
Tons.....	322,720	190,493	54,700
Cost.....	\$2,783,658	\$1,891,073	\$520,833
Nitrate of soda:			
Tons.....	85,714	42,213	19,518
Cost.....	\$3,730,070	\$1,760,432	\$709,841
Phosphate rock:			
Tons.....	1,529,124	888,571	787,927
Cost.....	\$8,621,094	\$4,244,554	\$3,554,174
Potash salts:			
Tons.....	257,766	122,107	(1)
Cost.....	\$7,327,549	\$3,606,701	\$3,098,400
Pyrites:			
Tons.....	456,574	342,962	288,778
Cost.....	\$2,831,994	\$2,020,759	\$1,466,285
Sulphuric acid:			
Tons.....	603,672	197,865	231,527
Cost.....	\$3,312,687	\$1,084,304	\$1,355,352
Sulphur:			
Tons.....	4,236	4,210	12,728
Cost.....	\$68,924	\$92,234	\$268,670
Superphosphates:			
Tons.....	415,656	320,559	286,898
Cost.....	\$3,946,440	\$2,912,010	\$2,176,245
Fish.....	\$3,031,437	\$847,142	\$183,542
All other materials.....	\$14,161,497	\$10,312,291	\$5,504,347

1 Figures not available.

STATE.	SULPHURIC ACID (TONS).				
	Total amount consumed in the industry.	Manufactured by fertilizer works.			Purchased.
		Number of establishments.	Consumed by establishment producing.	Sold.	
United States.....	1,445,607	94	841,935	153,057	603,672
Alabama.....	124,681	12	97,015	36,843	27,666
California.....	13,509	3	6,740	8,334	6,769
Florida.....	34,189	4	28,232	8,527	5,957
Georgia.....	263,143	27	220,593	49,794	42,550
Maryland.....	210,483	4	22,495	15,359	187,988
Mississippi.....	41,647	5	37,420	.....	4,227
North Carolina.....	88,094	8	87,899	576	195
South Carolina.....	169,243	14	161,509	11,839	7,734
Tennessee.....	70,145	4	53,188	866	16,957
Virginia.....	74,503	6	53,253	933	21,250
All other states.....	355,970	7	73,591	19,986	282,379

Of the total quantity of sulphuric acid used in 1909 in the establishments engaged primarily in the manufacture of fertilizers, 58.2 per cent was manufactured in the establishments and 41.8 per cent was purchased. Of the sulphuric acid made in fertilizer works, 84.6 per cent was used and 15.4 per cent was sold.

All fertilizer establishments manufacturing sulphuric acid employed the chamber process, 16 using the Hoffman intensifier system, 11 the Pratt, 9 the Gilchrist, 3 the Meyer tangential system, and 1 the Luney. The manufacture, for consumption in their own works, of 1,826,358 tons of acid phosphate was reported by establishments engaged primarily in the fertilizer industry, and 12,507 tons were made and consumed by establishments manufacturing fertilizers as a subsidiary product.

Materials used by all establishments making fertilizers.—The data in Tables 14 and 15 relate to the materials reported by the establishments manufacturing fertilizers as their chief product. There is a considerable consumption of these materials by establishments in other industries which make fertilizers as a subsidiary product. Table 16 shows the total consumption of these materials in 1909 by all establishments manufacturing fertilizers, whether as a primary or subsidiary product.

MATERIAL.	CONSUMPTION BY ALL ESTABLISHMENTS MANUFACTURING FERTILIZERS WHETHER AS PRIMARY OR SUBSIDIARY PRODUCTS: 1909	
	Quantity (tons).	Cost.
Ammoniates.....	842,557	\$17,200,611
Ammonium sulphate.....	65,592	3,732,112
Kainit.....	347,104	3,008,183
Nitrate of soda.....	89,846	3,916,320
Phosphate rock.....	1,549,497	8,828,834
Potash rock.....	270,459	7,714,367
Pyrites.....	456,574	2,831,994
Sulphuric acid.....	620,708	3,460,132
Sulphur.....	4,236	68,924
Superphosphates.....	532,886	5,176,157
Fish.....	242,045	3,076,613

Products of all establishments making fertilizers.—The total production of fertilizers in 1909, including those manufactured by slaughtering and meat-packing establishments and as a subsidiary product by other industries, was 5,618,234 tons, valued at \$100,089,971. The total production by all establishments in 1904 was 3,440,171 tons, valued at \$56,882,034, and in 1899, 2,887,004 tons, valued at \$42,097,673.

It should be noted in considering these statistics that the superphosphates purchased for use as material represent a duplication, the value of such superphosphates being reported as part of the value of product of other establishments in the industry, and the same may be true to some extent of sulphuric acid purchased. In 1909 there were purchased and used as material 532,886 tons of superphosphates, costing \$5,175,157 (see Table 16), which leaves 5,095,348 tons, valued at \$94,914,814, for the net production of fertilizers by all establishments.

Products of establishments in the fertilizer industry.—Table 17 shows the statistics of the products of establishments engaged primarily in the manufacture of fertilizers for 1909, 1904, and 1899.

PRODUCT.	1909	1904	1899
Total value.....	\$103,960,213	\$56,541,253	\$44,657,385
Fertilizers:			
Tons.....	5,240,164	3,267,777	2,794,705
Value.....	\$92,369,631	\$50,460,694	\$40,545,661
Superphosphates from minerals, bones, etc.—			
Tons.....	1,201,354	766,338	923,198
Value.....	\$13,318,529	\$7,515,257	\$8,471,943
Ammoniated fertilizers—			
Tons.....	472,757	775,987	142,898
Value.....	\$10,061,193	\$12,901,057	\$2,449,388
Concentrated phosphate fertilizers—			
Tons.....	313,838	(²)	(²)
Value.....	\$3,638,210	(²)	(²)
Complete fertilizers—			
Tons.....	2,717,797	1,329,149	1,436,682
Value.....	\$57,243,899	\$25,673,511	\$25,446,046
Other fertilizers—			
Tons.....	534,368	394,703	291,927
Value.....	\$8,107,800	\$4,370,869	\$4,178,284
Sulphuric acid, for sale (reduced to 50° Baumé):			
Tons.....	153,057	24,502	71,176
Value.....	\$923,492	\$194,578	\$427,925
Other acids for sale:			
Tons.....	30,651	45,689	(²)
Value.....	\$611,288	\$241,506	\$17,872
All other products.....	\$10,055,802	\$5,644,475	\$3,655,927

¹ In addition, in 1909, fertilizers and allied products to the value of \$7,911,268, and in 1904 to the value of \$6,467,340, were made by establishments engaged primarily in the manufacture of products other than fertilizers, including those in the slaughtering and meat-packing industry.

² Not reported.

In addition to the products covered by Table 17, the products shown in the following table were made and used in further processes of manufacture in the establishment where produced:

PRODUCT.	1909	1904
Acid phosphate..... tons.....	1,838,865	884,211
Sulphuric acid..... tons.....	841,935	692,904

The total quantity of fertilizers reported by fertilizer factories proper in 1909 was 5,240,164 tons, an increase of 2,445,459 tons, or 87.5 per cent, over the production in 1899. The highest rate of increase for

the decade appears for ammoniated fertilizers, 230.8 per cent, and the lowest for superphosphates, 30.1 per cent. Changes in grade and in place of production render comparisons of average values per ton of these products in the different years of little significance.

Table 19 gives, for 1909, the quantity and value of the different kinds of fertilizers produced by establishments engaged primarily in their manufacture, for the leading states.

In Table 2 the states are ranked according to the total value of products in 1909, the leading states being Georgia, Maryland, South Carolina, Virginia, New Jersey, Pennsylvania, and Alabama, in the order named. The three states first named had the same

rank according to tonnage of fertilizers produced, but Alabama ranked fourth in this respect, ahead of Virginia, New Jersey, and Pennsylvania. Georgia ranked first in 1909 in the production of complete fertilizers, ammoniated fertilizers, and superphosphates, fifth in concentrated phosphates, and second in the group of "other" fertilizers, while Maryland was second in complete fertilizers and superphosphates, third in ammoniated fertilizers, fourth in concentrated phosphates, and first in the group of "other" fertilizers. In ammoniated fertilizers and concentrated phosphates Alabama ranked second. New York ranked first in the production of concentrated phosphates.

THE FERTILIZER INDUSTRY—PRODUCTS, BY STATES: 1909.

Table 19	PRODUCT AND STATE.	Tons.	Value.	PRODUCT AND STATE.	Tons.	Value.	PRODUCT AND STATE.	Tons.	Value.
Fertilizers, all kinds		5,240,164	\$92,369,631	Superphosphates from minerals, bones, etc.—Con.			Complete fertilizers	2,717,787	\$67,243,899
Alabama	411,177	6,003,893		New York	47,538	\$533,640	Alabama	121,824	2,292,445
California	62,619	2,062,428		North Carolina	90,180	1,140,790	California	43,918	1,766,476
Connecticut	31,581	996,974		Ohio	44,624	582,537	Connecticut	27,090	890,286
Delaware	14,222	259,784		Pennsylvania	31,397	322,339	Florida	87,376	2,672,108
Florida	155,852	3,592,882		South Carolina	176,005	2,036,220	Georgia	492,532	10,060,146
Georgia	888,137	15,908,284		Tennessee	25,322	244,278	Illinois	74,810	1,277,555
Illinois	105,124	2,051,246		Virginia	68,046	786,217	Indiana	15,130	301,598
Indiana	21,850	408,323		All other states	9,822	150,902	Louisiana	44,488	860,072
Louisiana	78,878	1,396,960					Maine	18,137	329,417
Maine	28,777	580,657		Ammoniated fertilizers	472,757	10,061,193	Maryland	268,570	4,754,519
Maryland	608,699	8,983,265		Alabama	87,353	1,581,800	Mississippi	72,193	1,167,632
Mississippi	133,101	1,725,256		Florida	10,946	205,538	Missouri	8,875	176,345
Missouri	11,415	230,423		Georgia	102,573	2,071,728	New Jersey	247,595	5,433,495
New Jersey	343,703	6,506,830		Illinois	12,603	448,608	New York	73,560	1,345,716
New York	260,554	3,188,056		Maryland	49,972	1,260,624	North Carolina	142,592	3,031,198
North Carolina	323,562	5,945,986		New Jersey	6,721	112,696	Ohio	131,400	2,547,888
Ohio	224,222	4,011,943		New York	6,628	151,978	Pennsylvania	168,751	3,499,834
Pennsylvania	274,699	4,895,528		North Carolina	32,879	776,562	South Carolina	237,208	4,943,473
South Carolina	512,714	8,728,312		Ohio	12,310	302,362	Tennessee	139,343	2,776,372
Tennessee	179,356	3,234,114		Pennsylvania	33,009	544,797	Virginia	149,181	3,090,124
Texas	2,509	57,391		South Carolina	41,686	872,025	All other states	153,224	4,027,200
Virginia	364,613	6,560,787		Virginia	46,318	996,454			
All other states	202,800	5,040,309		All other states	29,759	736,021	Other fertilizers	534,368	8,107,800
Superphosphates from minerals, bones, etc.	1,201,354	13,318,529		Concentrated phosphates	313,388	3,638,210	Alabama	27,852	401,762
Alabama	109,519	1,147,291		Alabama	64,629	580,605	Florida	10,960	321,934
California	14,420	159,208		Delaware	11,872	225,529	Georgia	75,438	1,229,775
Florida	37,787	293,315		Florida	8,783	99,987	Illinois	5,609	59,416
Georgia	196,885	2,334,293		Georgia	20,709	212,342	Louisiana	4,813	81,784
Illinois	7,317	211,836		Illinois	4,785	53,831	Maine	6,240	106,040
Indiana	4,639	68,569		Louisiana	4,328	84,383	Maryland	81,256	838,839
Louisiana	22,249	288,386		Maryland	24,377	290,324	New Jersey	17,064	299,515
Maryland	184,524	1,838,959		New York	107,800	776,324	New York	25,028	380,398
Mississippi	59,902	540,200		Virginia	38,552	759,236	North Carolina	55,763	969,512
New Jersey	71,178	639,559		All other	28,053	555,650	Ohio	35,638	574,706
							Pennsylvania	39,523	504,208
							South Carolina	65,044	801,827
							Tennessee	13,937	194,756
							Virginia	62,516	928,757
							All other states	17,687	414,581

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the fertilizer industry are presented in Tables 20 and 21.

Table 20 shows for 1909, 1904, and 1899 the number of establishments, persons engaged in the industry,

primary horsepower, capital invested, principal items of expense, value of products, and value added by manufacture.

Table 21 gives more detailed statistics for the industry for 1909 only.

FERTILIZERS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

Table 20	STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
				Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
	United States	1909 1904 1899	550 399 422	21,950 18,091 13,654	323 294 381	3,317 1,813 1,712	18,310 14,184 11,581	64,711 47,988 38,890	\$121,537 68,917 80,888	\$4,408 1,834 2,125	\$7,477 5,127 4,185	\$69,522 39,288 28,858	\$103,960 56,541 44,657	\$34,438 17,253 15,669
	Alabama	1909 1904 1899	42 19 17	1,473 636 531	12 6 32	228 79 60	1,233 551 439	4,484 1,485 1,450	8,507 3,051 1,407	305 68 62	392 153 95	4,264 1,606 1,387	6,423 2,341 2,068	2,159 735 681
	California	1909 1904 1899	15 14 8	278 168 89	1 10 3	51 35 16	226 123 70	1,579 904 415	2,097 904 648	72 39 20	155 69 40	1,796 519 483	2,313 894 671	517 376 188
	Connecticut	1909 1904 1899	12 10 9	374 348 171	9 6 8	70 32 30	295 310 133	1,273 607 326	1,591 987 383	78 37 28	137 124 54	1,091 525 228	1,573 943 391	482 418 163
	Delaware	1909 1904 1899	10 7 11	153 162 174	5 8 9	14 6 17	134 149 148	805 665 725	406 206 497	22 4 17	52 33 51	452 287 400	860 371 739	408 84 339
	Florida	1909 1904 1899	12 8 7	710 304 150	1 4 4	121 61 29	589 242 117	1,710 555 412	3,768 899 733	160 63 27	218 70 40	2,875 1,325 331	3,878 1,590 500	1,003 265 169
	Georgia	1909 1904 1899	110 57 41	3,373 2,442 1,279	71 40 39	532 210 114	2,770 2,192 1,126	10,488 6,531 3,795	24,233 11,158 6,664	699 260 147	921 581 295	10,944 6,527 2,350	16,800 9,461 3,367	5,856 2,034 1,017
	Illinois	1909 1904 1899	11 4 5	615 61 398	3 4 4	168 13 52	444 48 337	2,145 445 1,315	2,525 546 1,633	208 16 75	225 24 172	1,425 91 1,006	2,386 131 1,855	661 40 849
	Indiana	1909 1904 1899	15 14 14	172 130 82	14 20 19	35 13 18	123 97 45	1,012 652 565	617 235 216	36 14 12	62 46 19	254 156 159	456 299 255	202 143 96
	Louisiana	1909 1904 1899	6 4 6	347 380 305	52 36 27	295 344 278	1,178 910 764	2,438 2,144 1,290	72 66 51	127 123 87	1,324 1,014 614	1,757 1,656 910	433 542 296	
	Maine	1909 1904 1899	5 3 3	118 31 37	7 4 1	16 1 2	95 26 34	323 228 80	439 54 49	19 1 3	36 12 7	431 39 22	597 66 40	166 27 18
	Maryland	1909 1904 1899	41 39 40	1,750 1,500 1,265	36 38 37	275 206 212	1,439 1,256 1,016	5,324 3,984 3,442	9,098 6,058 7,003	418 230 246	617 524 458	6,963 4,992 3,644	9,673 6,632 5,482	2,710 1,640 1,838
	Mississippi	1909 1904 1899	10 5 3	524 371 109	75 23 15	449 348 94	1,823 645 415	2,607 1,049 353	72 28 19	141 79 33	1,385 857 342	2,125 1,082 493	740 225 151	
	New Jersey	1909 1904 1899	22 25 28	1,384 1,253 1,147	17 23 30	159 91 155	1,208 1,139 962	2,459 3,555 2,678	7,398 6,291 5,690	255 151 230	541 637 441	5,685 3,928 3,146	7,672 5,652 4,291	1,987 1,724 1,145
	New York	1909 1904 1899	15 13 32	1,041 673 1,249	8 9 24	125 68 192	908 596 1,033	2,799 1,537 2,456	3,692 2,598 4,601	188 100 211	542 254 492	2,655 1,334 1,909	4,251 2,082 3,148	1,596 748 1,239
	North Carolina	1909 1904 1899	34 27 18	1,117 1,019 494	22 33 16	162 78 51	933 903 427	3,132 2,653 1,292	7,680 3,698 2,819	242 75 66	393 282 109	4,183 2,218 1,044	6,316 3,099 1,498	2,133 881 454
	Ohio	1909 1904 1899	27 17 27	1,064 604 506	13 8 28	210 106 80	841 490 400	3,059 2,630 2,168	4,950 3,551 1,888	237 136 104	368 235 174	2,535 1,386 1,017	4,435 2,289 1,657	1,900 903 640
	Pennsylvania	1909 1904 1899	48 43 51	1,517 1,136 975	52 48 43	241 129 167	1,224 958 765	5,174 4,551 3,835	6,332 5,386 3,803	293 170 201	575 447 352	4,613 2,891 2,584	6,543 4,095 3,644	1,930 1,204 1,060
	South Carolina	1909 1904 1899	26 20 22	2,057 1,221 1,862	2 1 5	204 149 85	1,851 1,071 1,772	4,766 4,286 3,940	11,857 7,087 10,505	338 153 165	671 304 479	5,629 2,692 3,108	9,025 3,638 4,883	3,396 946 1,775
	Tennessee	1909 1904 1899	12 10 5	870 854 492	12 6 4	99 67 45	559 781 443	2,152 1,970 943	4,106 3,381 950	137 98 49	204 210 94	2,122 1,712 790	3,249 2,701 1,466	1,127 989 676
	Virginia	1909 1904 1899	45 37 39	2,199 1,935 1,318	10 16 35	233 118 112	1,956 1,801 1,171	5,560 5,643 4,213	9,787 4,872 4,908	269 111 142	760 571 321	5,389 3,241 2,161	8,035 4,659 3,416	2,646 1,418 1,255
	All other states	1909 1904 1899	32 23 36	1,014 864 1,026	29 17 22	247 93 233	738 754 771	3,466 3,605 3,451	7,239 4,762 4,646	286 114 250	340 349 372	3,507 1,948 2,233	5,593 2,960 3,883	2,086 1,012 1,650

FERTILIZERS—DETAILED STATISTICS, BY STATES: 1909.

Table 21

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.									WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horse-power.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.	
								Maximum month.	Minimum month.						
United States....	550	21,950	323	1,000	2,042	275	18,310	Mh 29,310	Jy 14,264	18,653	18,466	120	68	64,711	
Alabama.....	42	1,473	12	89	129	10	1,233	Mh 2,785	Au 658	1,421	1,413	.....	8	4,484
California.....	15	278	1	19	28	4	226	Mh 263	Au 203	230	229	1	.....	1,579
Connecticut.....	12	374	9	18	41	11	295	My 394	Ja 185	224	202	20	2	1,273	
Delaware.....	10	153	5	6	7	1	134	Oc 284	Ja 19	120	120	.....	.....	805
Florida.....	12	710	.....	40	67	14	589	Fe 820	Jy 471	591	583	2	6	1,710
Georgia.....	110	3,373	71	195	310	27	2,770	Mh 6,851	Jy 1,366	3,070	3,030	4	36	10,488	
Illinois.....	11	615	3	23	127	18	444	Se 508	Oc 377	459	412	47	.....	2,145
Indiana.....	15	172	14	13	14	8	123	Se 204	Jy 93	123	122	.....	1	1,012
Louisiana.....	6	347	.....	12	37	3	295	Fe 607	Jy 94	360	360	.....	.....	1,178
Maine.....	5	118	7	5	6	5	95	Ap 144	Au 44	104	102	.....	2	323
Maryland.....	41	1,750	36	94	165	16	1,439	Se 2,115	No 1,110	1,326	1,316	10	.....	5,324
Mississippi.....	10	624	.....	29	41	5	449	Mh 811	Je 216	523	523	.....	.....	1,823
Missouri.....	5	142	1	11	31	1	98	Se 122	Oc 77	98	98	.....	.....	700
New Jersey.....	22	1,354	17	40	110	9	1,208	Mh 1,518	Ja 1,086	1,235	1,217	15	3	2,459	
New York.....	15	1,041	8	28	75	22	908	Au 1,143	No 671	686	686	.....	.....	2,799
North Carolina.....	34	1,117	22	58	97	7	933	Ap 1,694	Jy 494	896	896	.....	.....	3,132
Ohio.....	27	1,064	13	51	138	21	841	Se 1,522	Fe 676	739	738	1	.....	3,059
Pennsylvania.....	48	1,517	52	60	147	34	1,224	Ap 1,473	Je 1,109	1,162	1,159	.....	3	5,174
South Carolina.....	26	2,057	2	67	127	10	1,851	Mh 4,356	Jy 922	1,669	1,668	1	.....	4,766
Tennessee.....	12	670	12	23	71	5	559	Mh 893	Je 372	517	517	.....	.....	2,152
Texas.....	3	22	5	1	6	1	9	Fe 21	Jy ¹ 4	21	21	.....	.....	53
Virginia.....	45	2,199	10	92	121	20	1,956	Se 2,517	De 1,027	2,516	2,504	7	5	5,560	
All other states ²	24	850	23	26	147	23	631	.....	.....	563	549	12	2	2,713

STATE.	Capital.	EXPENSES.										Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					Value of products.
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States....	\$121,537,451	\$80,101,293	\$2,110,616	\$2,295,020	\$7,477,179	\$1,452,809	\$68,069,111	\$192,605	\$623,637	\$36,935	\$7,843,381	\$103,960,213	\$34,438,293
Alabama.....	8,507,401	5,658,019	156,423	148,931	392,413	93,177	4,171,188	3,154	64,429	1,491	626,813	6,423,233	2,158,868
California.....	2,096,654	2,167,719	38,066	34,169	154,802	28,746	1,767,032	16,041	10,235	.....	118,628	2,312,555	516,777
Connecticut.....	1,590,640	1,413,764	39,823	37,930	136,893	25,788	1,065,273	.....	5,137	.....	102,920	1,572,575	481,514
Delaware.....	406,091	610,037	17,378	4,455	51,970	14,510	437,477	29,815	2,418	.....	52,014	859,517	407,530
Florida.....	3,758,094	3,526,475	87,159	72,923	217,947	28,672	2,845,945	5,160	24,287	.....	244,382	3,878,296	1,003,679
Georgia.....	24,232,757	14,090,036	349,745	348,812	920,513	177,905	10,766,246	24,764	104,683	2,894	1,394,474	16,800,301	5,856,150
Illinois.....	2,525,349	1,978,538	59,480	148,430	225,464	65,716	1,358,801	10,459	3,643	.....	106,545	2,385,951	961,434
Indiana.....	616,553	390,187	18,810	16,735	62,379	12,849	240,905	745	2,389	.....	35,375	456,362	202,608
Louisiana.....	2,438,332	1,641,722	29,205	42,526	127,705	19,846	1,304,632	765	8,162	.....	108,881	1,757,091	432,613
Maine.....	438,735	503,167	8,780	10,020	36,690	2,210	428,626	282	827	.....	15,782	596,623	165,787
Maryland.....	9,097,853	8,568,599	222,847	194,996	616,633	79,320	6,883,405	20,763	45,820	171	504,644	9,672,786	2,710,061
Mississippi.....	2,606,692	1,749,831	42,456	29,910	140,869	45,769	1,339,189	600	24,509	.....	126,529	2,125,029	740,071
Missouri.....	521,166	309,578	24,060	31,202	46,934	11,037	171,759	.....	1,473	3,000	20,113	301,949	119,153
New Jersey.....	7,398,293	6,973,589	126,056	129,020	541,188	94,821	5,590,366	2,175	22,933	.....	467,030	7,671,859	1,986,672
New York.....	3,692,388	3,610,137	89,158	98,617	542,119	85,799	2,568,968	7,020	11,734	1,300	205,422	4,250,568	1,595,801
North Carolina.....	7,679,857	5,389,466	117,534	124,799	392,752	69,658	4,113,545	6,802	69,953	7,307	487,116	6,316,485	2,133,282
Ohio.....	4,950,438	3,583,213	99,669	137,822	367,948	66,782	2,468,003	2,264	22,741	1,229	416,755	4,434,541	1,899,756
Pennsylvania.....	6,531,843	5,956,189	140,531	152,512	575,099	128,781	4,484,089	40,523	25,051	.....	409,603	6,542,844	1,929,974
South Carolina.....	11,857,225	7,571,240	181,057	156,445	671,261	161,717	5,467,741	13,444	83,006	.....	836,569	9,024,900	3,395,442
Tennessee.....	4,105,633	2,847,758	49,532	87,167	203,750	32,629	2,089,099	1,550	18,854	.....	365,177	3,249,343	1,127,615
Texas.....	19,763	59,803	143	4,855	2,892	905	47,734	15	90	.....	3,169	57,391	8,752
Virginia.....	9,766,831	7,198,108	149,315	120,087	759,514	152,499	5,236,611	3,202	49,333	.....	727,547	8,034,543	2,645,433
All other states ²	6,698,863	4,304,118	63,419	162,657	289,444	53,673	3,222,477	3,082	21,930	19,543	467,893	5,235,471	1,959,321

¹ Same number reported for one or more other months.

² All other states embrace: Arkansas, 1 establishment; Idaho, 1; Iowa, 1; Kansas, 1; Kentucky, 4; Massachusetts, 6; Michigan, 3; Minnesota, 1; Oregon, 1; Rhode Island, 2; Utah, 2; Wisconsin, 1.

OIL, ESSENTIAL

THE MANUFACTURE OF ESSENTIAL OILS.

Scope of the industry.—The establishments included under the designation "oil, essential," embrace those engaged primarily in the manufacture of the natural essential vegetable oils, both crude and refined, except turpentine, and that of witch-hazel extract. The list of essential oils is a long one, but the bulk of the production is represented by peppermint, wintergreen, black-birch, and spearmint oils. The statistics for the production of essential oils by establishments engaged primarily in the manufacture of products other than essential oils (chemicals, flavoring extracts, etc.) are not included in this report except as specially noted.

Summary and comparisons with earlier censuses.—Statistics for the essential-oil industry were first obtained at the census of 1859. At this census 45 establishments, giving employment to 74 hands, were reported, the value of their products amounting to \$124,317.

Table 1 summarizes the statistics for the manufacture of essential oils for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	68	52	47	67	124	118	44.7	30.8	10.6	-29.9	-46.0	5.1
Persons engaged in the industry.....	408	277	(²)	(²)	(²)	(²)	.....	72.2	.....	.....	.....	.....
Proprietors and firm members.....	73	68	(²)	(²)	(²)	(²)	.....	7.4	.....	.....	.....	.....
Salaried employees.....	45	37	39	(²)	(²)	(²)	.....	.....	.....	.....	.....	.....
Wage earners (average number).....	290	132	168	197	278	(²)	15.4	21.6	-5.1	(²)	(²)	.....
Primary horsepower.....	1,218	849	1,048	465	(²)	34	72.6	119.7	-21.4	(²)	(²)	.....
Capital.....	\$1,365,438	\$723,004	\$576,286	\$102,223	\$67,755	\$145,475	136.9	88.9	25.5	463.8	50.9	-53.4
Expenses.....	1,522,171	1,299,069	723,505	201,689	(²)	(²)	110.4	17.2	79.6	258.7	.....	.....
Services.....	184,495	109,713	86,148	37,492	24,030	32,864	114.2	68.2	27.4	129.8	56.0	-26.9
Salaries.....	61,505	40,002	24,733	(²)	(²)	(²)	148.7	53.8	61.7	.....	.....	.....
Wages.....	122,990	69,711	61,415	(²)	(²)	(²)	100.3	76.4	13.5	.....	.....	.....
Materials.....	1,255,478	1,110,470	588,594	129,735	125,167	274,058	113.3	13.1	88.7	353.7	3.6	-54.3
Miscellaneous.....	82,198	78,886	48,763	34,462	(²)	(²)	68.6	4.2	61.8	41.5	.....	.....
Value of products.....	1,737,234	1,464,662	813,495	255,847	248,858	631,445	113.6	18.6	80.0	218.0	2.8	-60.6
Value added by manufacture (value of products less cost of materials).....	481,756	354,192	224,901	126,112	123,691	357,387	114.2	36.0	57.5	78.3	2.0	-65.4

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The number of establishments in this industry shows a considerable decrease between 1879 and 1899, but has increased somewhat since that date. The very considerable decrease in value of products shown for the period 1869-1879, even after making allowance for the fact that the figures for 1869 were reported in a depreciated currency, taken in connection with the even greater increase from 1859 to 1869, makes it seem probable that at the census of 1869 the production of essential oils on farms was included in the manufactures statistics. The value of products shows an increase for each intercensal period since 1879.

Summary, by states.—The five leading states in the manufacture of essential oils in 1909, as measured by value of products, were Michigan, New Jersey, Connecticut, New York, and Pennsylvania, in the order named; the five leading states in 1904 were New York, Connecticut, New Jersey, Michigan, and Indiana. Michigan ranked first in 1909, with products valued at \$486,159, or 28 per cent of the total, and fourth in 1904, with products valued at \$240,215, showing an increase for the five-year period of 102.4 per cent, while New York ranked fourth in 1909, with products valued at \$195,363, and first in 1904, with products

valued at \$502,014, showing a decrease of 61.1 per cent. For the industry as a whole the increase in value of products from 1904 to 1909 was 18.6 per cent.

Persons engaged in the industry.—Table 4 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	408	390	18
Proprietors and officials.....	91	91	.....
Proprietors and firm members.....	73	73	.....
Salaried officers of corporations.....	8	8	.....
Superintendents and managers.....	10	10	.....
Clerks.....	27	22	5
Wage earners (average number).....	290	277	13
16 years of age and over.....	290	277	13
Under 16 years of age.....	.....	.....	.....

The average number of persons engaged in the industry during 1909 was 408, of whom 290, or 71.1 per cent, were wage earners; 91, or 22.3 per cent, proprietors and officials; and 27, or 6.6 per cent, clerks, the latter class including other subordinate salaried employees. Of the total number engaged in the industry, 390, or 95.6 per cent, were males, and 18, or 4.4 per cent, females. No wage earners under 16 years of age were reported. The average number of wage earners distributed by sex and age is not shown for the individual states, but Table 9 gives such a distribution of the number employed on December 15, or the nearest representative day.

Wage earners employed, by months.—Table 3 gives the number of wage earners employed in the industry on the 15th (or nearest representative day) of each month during the year 1909.

MONTH.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	211	53.4
February.....	215	54.4
March.....	310	78.5
April.....	395	100.0
May.....	380	96.2
June.....	317	80.3
July.....	206	52.2
August.....	234	59.2
September.....	303	76.7
October.....	338	85.6
November.....	336	85.1
December.....	233	59.0

In the industry as a whole the largest number of wage earners employed during any month of 1909 was 395, in April, and the smallest number, 206, in July, the minimum number being equal to 52.2 per cent of the maximum. In 1904 the maximum number was 168, in January and March, and the minimum, 88, in July.

Prevailing hours of labor.—In Table 4 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

PREVAILING HOURS OF LABOR PER WEEK.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Average number.	Per cent of total.
Total.....	290	100.0
48 and under.....	12	4.1
Between 48 and 54.....	13	4.5
54.....	41	14.1
Between 54 and 60.....	9	3.1
60.....	172	59.3
Between 60 and 72.....	15	5.2
72.....	27	9.3
Over 72.....	1	0.3

Of the 290 wage earners reported for 1909, 172, or 59.3 per cent, were employed in establishments where the prevailing hours of labor were 60 per week; 75, or 25.9 per cent, in establishments where the prevailing hours were less than 60 per week; and 43, or 14.8 per cent, in establishments where the prevailing hours were more than 60 per week.

Character of ownership.—Table 5 presents statistics with respect to the character of ownership of the establishments in the essential-oil industry for 1909 and 1904.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	68	52	\$1,737,234	\$1,464,662
Individual.....	44	32	490,642	305,192
Firm.....	13	13	65,283	498,332
Corporation.....	11	7	1,181,309	661,138
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	64.7	61.5	28.2	20.8
Firm.....	19.1	25.0	3.8	34.0
Corporation.....	16.2	13.5	68.0	45.1

Of the total number of establishments in the industry, 16.2 per cent were under corporate ownership in 1909, as compared with 13.5 per cent in 1904; these establishments reported 68 per cent of the total value of products in 1909 and 45.1 per cent in 1904. Establishments under firm ownership decreased considerably in relative importance during the five-year period, reporting only 3.8 per cent of the total value of products in 1909, as compared with 34 per cent in 1904.

Size of establishments.—Table 6 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	68	52	\$1,737,234	\$1,464,662
Less than \$5,000.....	44	33	70,594	56,614
\$5,000 and less than \$20,000.....	12	8	120,316	62,999
\$20,000 and less than \$100,000.....	7	6	249,908	205,311
\$100,000 and less than \$1,000,000..	5	5	1,296,416	1,139,738
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	64.7	63.5	4.1	3.9
\$5,000 and less than \$20,000.....	17.6	15.4	6.9	4.3
\$20,000 and less than \$100,000.....	10.3	11.5	14.4	14.0
\$100,000 and less than \$1,000,000..	7.4	9.6	74.6	77.8

Of the total number of establishments (68 in 1909 and 52 in 1904) there were 5 at each census whose products were valued at more than \$100,000, and these establishments reported 74.6 per cent of the total value of products in 1909, as compared with 77.8 per cent in 1904. The average value of products per establishment decreased from \$28,167 in 1904 to \$25,548 in 1909, but the average value added by manufacture, as computed from the figures in Table 1, increased from \$6,811 in 1904 to \$7,085 in 1909, while the average number of wage earners per establishment increased from 2.5 in 1904 to 4.3 in 1909.

A classification of the establishments according to the number of wage earners employed shows that of the 68 establishments in the industry in 1909, 5 employed no wage earners, 52 employed from 1 to 5 wage earners, 9 employed from 6 to 20, and 2 employed more than 20. Of the total number of wage earners, however, 41 per cent were in the 2 establishments employing more than 20 wage earners.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$1,522,171, distributed as follows: Cost of materials, \$1,255,478, or 82.5 per cent; wages, \$122,990, or 8.1 per cent; salaries, \$61,505, or 4 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$82,198, or 5.4 per cent. These proportions vary somewhat in the several states, largely by reason of differences in the character of the products.

Engines and power.—Of the 68 establishments in the industry, 43 reported the use of power, with a total of 1,218 primary horsepower. The greater part of the power reported (80.4 per cent) was steam power.

Fuel consumed.—The fuel consumed in the industry in 1909 for all purposes—generation of power, distillation, etc.—comprised 5,743 long tons of anthracite coal, 2,107 short tons of bituminous coal, 594 cords of wood, and small quantities of other fuels. The amount expended for fuel and rent of power in 1909 was \$26,305.

Materials and products.—The principal materials used in the industry are grain alcohol, crude essential oils for refining, and the herbs, leaves, bark, roots, etc., from which the crude oil is extracted. The consumption of grain alcohol in the industry amounted to 75,274 gallons, costing \$188,618, in 1909, as compared with 84,602 gallons, costing \$206,255, in 1904, and 13,258 gallons, costing \$44,888, in 1899.

Table 7 gives the quantity and value of the most important products reported by the establishments engaged primarily in the manufacture of essential oils, for 1909, 1904, and 1899.

The production of essential oils increased in value during the decade 1899–1909, 58.2 per cent, while the value of the witch-hazel extract produced in 1909 was over seven times that in 1899. The production of each kind of essential oil for which comparative figures are available was considerably greater in 1909 than in either 1904 or 1899. The production of witch-hazel in 1909, however, represented a decrease of 14.9 per

cent as compared with 1904, although it was more than six times as great as in 1899.

PRODUCT.	1909	1904	1899
Total value	¹ \$1,737,234	¹ \$1,484,662	\$813,495
Essential oils.....	\$1,108,603	\$1,023,937	\$700,709
Peppermint—			
Pounds.....	305,781	130,022	202,550
Value.....	\$519,079	\$470,037	\$188,559
Black birch—			
Pounds.....	67,053	(²)	(²)
Value.....	\$102,045	(²)	(²)
Spearmint—			
Pounds.....	33,400	(²)	(²)
Value.....	\$83,283	(²)	(²)
Wintergreen—			
Pounds.....	22,281	4,737	2,166
Value.....	\$68,983	\$15,579	\$3,638
Other—			
Pounds.....	(³)	327,908	638,024
Value.....	\$335,213	\$538,321	\$508,512
Witch-hazel extract:			
Gallons.....	679,190	797,700	110,260
Value.....	\$412,322	\$367,873	\$54,649
All other products.....	\$216,309	\$72,852	\$58,137

¹ In addition, essential oils to the value of \$117,489 in 1909 and \$14,500 in 1904 were produced by establishments engaged primarily in the manufacture of products other than essential oils.

² Not reported separately.

Table 8 gives, by states, the amount and value of each of the specific products manufactured in 1909, so far as such statistics can be given in detail.

PRODUCT AND STATE.	Quantity.	Value.
	<i>Pounds.</i>	
Essential oils		\$1,108,603
Indiana.....		20,320
Massachusetts.....		13,156
Michigan.....		484,099
New York.....		169,553
Pennsylvania.....		43,250
Virginia.....		6,230
All other states.....		371,995
Black birch	67,053	102,045
Connecticut.....	49,468	74,059
Pennsylvania.....	11,500	18,250
All other states.....	6,085	9,736
Peppermint	305,781	519,079
<i>Crude</i>	269,081	450,981
<i>Refined</i>	36,700	68,098
Michigan.....	227,521	382,613
All other states.....	78,260	136,466
Sassafras	9,704	6,355
Spearmint (crude)	33,400	83,283
Spruce ¹	9,462	3,420
Massachusetts.....	9,462	3,420
Tansy	2,548	6,994
Michigan.....	2,548	6,994
Wintergreen ¹	22,281	68,983
Wormwood	1,889	9,514
Michigan.....	1,646	7,864
All other states.....	343	1,650
All other essential oils ¹		308,930
New York.....		38,287
All other states.....		270,643
	<i>Gallons.</i>	
Witch-hazel extract ¹	679,190	412,322

¹ In addition, essential oils and allied products to the value of \$117,480 were produced by establishments engaged primarily in the manufacture of products other than essential oils, these products comprising oil of wintergreen to the value of \$81,419, oil of spruce to the value of \$3,202, other essential oils to the value of \$25,397, and witch-hazel extract to the value of \$7,471.

The group of "other" essential oils includes, among others, the oils of camphor, capsicum, cedar, cloves, dittany, erigeron, fireweed, ginger, lemon, orange,

orris, parsley, patchouli, pennyroyal, and sandalwood. Connecticut is the chief producer of oil of black birch and witch-hazel extract; Michigan, of oil of peppermint, spearmint, tansy, and wormwood; New Jersey, of oil of wintergreen; and Virginia, of oil of sassafras.

Detailed state table.—The principal statistics secured by the census inquiry concerning the essential-

oil industry are presented, by states, in Table 9, which gives detailed statistics for 1909 concerning the number of establishments, the number of persons engaged in the industry, the number of wage earners reported on December 15, or the nearest representative day, primary horsepower, capital, expenses, the total value of products, and the value added by manufacture.

OIL, ESSENTIAL—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.				Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.		Female.	Male.	Female.		
								Maximum month.	Minimum month.							
United States.....	68	408	73	18	22	5	290	Ap	395	Jy	208	376	359	17	.....	1,218
Indiana.....	8	25	10	.....	.....	.....	15	My	43	Ja ¹	0	20	20	.....	.....	60
Massachusetts.....	5	12	6	.....	.....	.....	6	No ²	11	Jy	2	11	11	.....	.....	12
Michigan.....	23	89	27	3	4	1	54	Au	111	Ja ²	15	104	100	4	.....	365
New York.....	6	28	5	4	1	.....	18	No ²	27	Je ²	13	32	31	1	.....	124
Pennsylvania.....	5	97	3	2	2	1	89	Oc	164	Jy ²	20	40	40	.....	.....	102
Virginia.....	5	12	6	.....	.....	.....	6	Ap ²	13	Ja	0	16	16	.....	.....	48
All other states ³	16	145	16	9	15	3	102	.....	.....	.....	.....	153	141	12	.....	507

STATE	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States.....	\$1,385,438	\$1,522,171	\$40,366	\$21,139	\$122,990	\$26,305	\$1,228,173	\$2,925	\$8,370	\$20	\$72,883	\$1,737,234	\$481,756
Indiana.....	85,570	11,032	.....	.....	4,750	532	1,320	1,370	298	20	2,742	20,570	18,718
Massachusetts.....	3,450	9,701	.....	.....	2,544	300	5,628	200	35	.....	994	13,156	7,228
Michigan.....	305,895	453,857	9,200	3,900	16,571	2,443	412,639	.....	1,904	.....	7,200	486,159	71,077
New York.....	133,818	165,037	6,100	855	11,259	7,193	120,160	1,155	323	.....	17,992	195,363	68,010
Pennsylvania.....	46,006	85,919	2,356	1,220	28,002	674	45,579	15	821	.....	7,252	111,065	64,812
Virginia.....	3,850	4,151	.....	.....	1,240	65	2,640	.....	28	.....	178	6,230	3,525
All other states ³	786,849	792,474	22,710	15,164	58,624	15,098	641,207	185	2,961	.....	36,525	904,691	248,386

¹ None reported for one or more other months.

² Same number reported for one or more other months.

³ All other states embrace: California, 1 establishment; Connecticut, 11; New Jersey, 2; Wisconsin, 2.

PAINT AND VARNISH

THE PAINT AND VARNISH INDUSTRY.

GENERAL STATISTICS.

Scope of the classification.—The statistics of the paint and varnish industry cover the returns of two classes of establishments—(1) those engaged primarily in the manufacture of pigments or paints, and (2) those engaged primarily in the manufacture of varnishes, japans, lacquers, or fillers. Linseed oil manufactured for use within the producing establishment was not separately returned as a product, but separate reports were made for the value of oil manufactured for sale as such. The principal products of establishments of the second class—varnishes, shellacs, japans, and lacquers—are mainly solutions of gums, resins, asphaltum, or other ingredients in such solvents or vehicles as turpentine, linseed oil, alcohol, naphtha, benzine, etc.

The statistics for each branch of the paint and varnish industry have been tabulated separately, but the tables following generally show totals for the combined industry only, since many establishments manufacture both classes of products and can not properly be classified as belonging solely to either branch.

Table 1 presents a summary of the statistics of the paint and varnish industry as a whole and of each branch for the year 1909.

Of the 791 establishments in the industry as a whole in 1909, about three-fourths (588) manufactured pigments or paints as products of chief value, and these reported approximately three-fourths of the value of products, five-sixths of the number of wage earners, and four-fifths of the amount paid for wages and the cost of materials. The establishments in the industry as a whole gave employment to an average of 21,896

persons, of whom 14,240 were wage earners, and paid out \$18,649,074 in salaries and wages. The cost of materials used in the industry in 1909 was \$79,015,555, or more than three-fifths (63.3 per cent) of the total value of products, which was \$124,889,422, and the value added by manufacture (that is, the value of products less the cost of materials) was \$45,873,867.

Table 1

	PAINT AND VARNISH INDUSTRY: 1909		
	Total for the industry.	Establishments engaged primarily in the manufacture of—	
		Paint.	Varnish.
Number of establishments.....	791	588	203
Persons engaged in the industry.....	21,896	17,168	4,728
Proprietors and firm members.....	456	355	101
Salaried employees.....	7,200	4,949	2,251
Wage earners (average number)....	14,240	11,864	2,376
Primary horsepower.....	56,162	50,566	6,596
Capital.....	\$103,994,908	\$77,886,395	\$26,108,513
Expenses.....	111,202,408	84,786,984	26,415,424
Services.....	18,649,074	13,326,786	5,322,288
Salaries.....	10,378,361	6,589,988	3,788,373
Wages.....	8,270,713	6,736,798	1,533,915
Materials.....	79,015,555	62,458,250	16,557,305
Miscellaneous.....	13,537,779	9,001,943	4,535,831
Value of products.....	124,889,422	94,672,005	30,317,417
Value added by manufacture (value of products less cost of materials).....	45,873,867	32,113,755	13,760,112

Comparison with earlier censuses.—Table 2 summarizes the statistics of the combined industry for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 2

	PAINT AND VARNISH INDUSTRY.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	791	639	600	(²) 522	(²) 325	(²) 202	31.8	23.8	6.5	14.9	60.6	60.9
Persons engaged in the industry.....	21,896	16,480	13,819	(²)	(²)	(²)	58.4	32.9	19.3			
Proprietors and firm members.....	456	439	412	(²)	(²)	(²)	10.7	3.9	6.6			
Salaried employees.....	7,200	4,408	3,710	(²)	(²)	(²)	94.1	63.3	18.8			
Wage earners (average number)....	14,240	11,633	9,697	8,189	5,056	3,355	46.8	22.4	20.0	(²)	(²)	(²)
Primary horsepower.....	56,162	41,288	30,443	24,640	(²)	7,487	84.5	36.0	35.6	23.6		
Capital.....	\$103,994,908	\$75,486,214	\$60,052,674	\$45,318,146	\$17,333,392	\$13,325,140	73.2	37.8	25.7	32.5	161.4	30.1
Expenses.....	111,202,408	81,419,070	59,727,461	44,441,120	(²)	(²)	86.2	36.6	36.3	34.4		
Services.....	18,649,074	11,941,059	9,942,241	7,354,687	2,498,971	1,819,096	87.6	56.2	20.1	35.2	194.3	37.4
Salaries.....	10,378,361	5,677,451	5,016,651	(²)	(²)	(²)	106.9	82.8	13.2			
Wages.....	8,270,713	6,263,698	4,925,590	(²)	(²)	(²)	67.9	32.0	27.2			
Materials.....	79,015,555	69,826,674	44,738,617	32,736,195	20,762,236	14,779,825	76.6	32.1	33.7	36.7	57.7	40.5
Miscellaneous.....	13,537,779	9,651,337	5,046,703	4,350,238	(²)	(²)	168.2	40.3	91.2	16.0		
Value of products.....	124,889,422	90,839,609	69,562,235	54,233,681	29,111,941	21,923,810	79.5	37.5	30.6	28.3	86.3	32.8
Value added by manufacture (value of products less cost of materials).....	45,873,867	31,012,935	24,823,718	21,497,486	8,349,705	7,143,985	84.8	47.9	24.9	15.5	157.4	16.9

¹ Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The value of products increased \$55,327,187, or 79.5 per cent, during the decade 1899-1909, being almost six times as great in 1909 as in 1869. The largest relative increase in value of products during any decade was that during the period 1879-1889,

86.3 per cent, but the rate of increase for the decade 1899-1909 was also high, 79.5 per cent, and in absolute amount the increase for the latter period was more than twice that for the former period. Increases in all items are shown for each census period.

Summary by states.—Table 3 summarizes the more important statistics of the industry as a whole, by states, the states being arranged according to the value of products reported for 1909. The states shown in

this table are given their actual ranking among all states, the rank of certain states for which data can not be presented being higher than that of some named in the table.

Table 3

PAINT AND VARNISH INDUSTRY.

STATE.	Number of establishments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹											
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.		
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
		1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	
United States.	791	14,240	100.0	.....	.....	\$124,889,422	100.0	.....	.....	\$45,873,867	100.0	.....	.....	46.8	22.4	20.0	79.5	37.5	30.6	84.8	47.9	24.9
New York.....	147	3,047	21.4	1	1	28,559,474	22.9	1	1	10,664,108	23.2	1	1	12.4	-6.2	19.9	51.3	13.7	33.1	62.1	29.2	25.4
Illinois.....	74	1,792	12.6	3	3	20,434,291	16.4	2	2	7,532,680	16.4	2	2	101.6	40.4	43.5	149.9	53.4	62.9	198.3	61.3	84.9
Pennsylvania.....	114	1,992	14.0	2	2	14,019,744	11.2	3	3	4,818,750	10.5	4	3	9.7	9.5	0.2	24.1	20.5	3.0	2.4	34.9	-24.1
Ohio.....	87	1,535	10.8	4	4	13,617,180	10.9	4	4	5,047,143	11.0	3	5	82.3	38.2	31.9	103.1	59.6	27.2	94.9	88.7	3.3
New Jersey.....	63	1,493	10.5	5	5	12,766,929	10.2	5	5	4,540,956	9.9	5	4	76.3	55.5	13.3	105.5	83.2	12.1	90.1	53.7	23.7
Michigan.....	20	1,024	7.2	6	6	7,415,914	5.9	6	7	3,383,568	7.4	6	6	109.0	58.0	32.2	118.9	24.5	75.9	138.5	33.0	79.3
Missouri.....	32	685	4.8	7	7	6,827,747	5.5	7	6	2,129,487	4.6	7	7	33.0	13.4	17.3	49.9	6.7	40.5	78.1	28.1	39.0
California.....	35	396	2.8	9	9	3,758,030	3.0	8	9	1,105,996	2.4	9	9	123.7	35.2	65.5	198.5	58.6	88.2	248.9	59.8	118.3
Massachusetts.....	41	428	3.0	8	8	3,498,590	2.8	9	8	1,993,896	3.0	8	8	10.3	-4.0	14.9	38.4	34.8	2.7	54.9	47.7	4.9
Kentucky.....	17	146	1.0	14	12	1,962,081	1.6	10	11	749,538	1.6	10	10	.....	2.1	.....	182.7	91.8	47.4	234.4	63.5	104.5
Connecticut.....	17	236	1.6	10	13	1,543,010	1.2	11	14	717,547	1.6	11	11	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin.....	12	194	1.4	12	11	1,525,296	1.2	12	10	483,223	1.1	13	14	.....	27.6	.....	73.0	45.6	18.8	134.5	70.1	37.9
Minnesota.....	14	164	1.2	13	15	1,438,692	1.2	13	12	599,475	1.3	12	13	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nebraska.....	4	112	0.8	16	18	1,254,475	1.0	14	17	405,318	0.9	15	17	.....	.....	.....	49.6	251.4	-58.6	33.2	268.2	-63.8
Indiana.....	18	200	1.4	11	16	1,107,895	0.9	15	13	424,760	0.9	14	12	.....	.....	.....	174.9	48.1	85.6	187.2	36.7	110.1
Maryland.....	12	127	0.9	15	10	1,000,938	0.8	16	15	301,424	0.7	16	15	4.1	.....	.....	97.2	.....	.....	45.4	.....	.....
Kansas.....	6	104	0.7	17	26	579,674	0.5	17	28	165,049	0.4	19	28	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rhode Island.....	6	37	0.3	22	23	471,361	0.4	18	18	184,238	0.4	17	21	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	6	71	0.5	18	17	396,712	0.3	20	16	158,731	0.4	20	16	.....	.....	.....	162.9	-17.5	218.5	.....	.....	-17.6
Virginia.....	8	53	0.4	21	14	344,626	0.3	21	22	156,587	0.3	21	19	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington.....	5	57	0.4	19	20	231,838	0.2	23	24	127,343	0.3	22	24	.....	.....	.....	.....	69.9	.....	.....	.....	.....
Delaware.....	4	57	0.4	19	21	245,445	0.2	24	27	96,123	0.2	23	25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia.....	7	35	0.2	23	21	221,508	0.2	25	20	49,026	0.1	29	20	.....	.....	.....	22.0	-14.0	41.8	.....	.....	-51.5
Iowa.....	4	18	0.1	27	25	153,782	0.1	27	26	68,697	0.1	25	26	.....	.....	.....	-54.3	.....	-74.5	.....	.....	.....
Maine.....	4	15	0.1	28	27	140,087	0.1	28	25	39,760	0.1	30	27	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas.....	6	26	0.2	26	27	114,418	0.1	29	33	51,678	0.1	28	33	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	29	196	1.4	.....	.....	1,189,126	1.0	.....	.....	478,766	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 23. A minus sign (-) denotes decrease. Percentages are omitted where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparable figures can not be given without disclosing individual operations.

New York ranked first at the censuses of 1909 and 1904 in average number of wage earners, value of products, and value added by manufacture. In average number of wage earners, Pennsylvania held second place at both censuses, but in value of products and value added by manufacture Illinois was second. The highest percentages of increase for the decade as a whole which are shown for any of the 10 leading states are those for California, but for the five-year period 1904-1909 Michigan shows the highest rate of increase in wage earners, Kentucky in value of products, and Ohio in value added by manufacture.

Persons engaged in the industry.—Table 4 shows for 1909 the number of persons engaged in the industry classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the paint and varnish industry during 1909 was 21,896, of whom 14,240, or 65 per cent, were wage earners; 2,016, or 9.2 per cent, proprietors and officials; and 5,640, or 25.8 per cent, clerks, this class including other subordinate salaried employees. Of the total number of

persons engaged in the industry, 19,496, or 89 per cent, were males, and 2,400, or 11 per cent, females.

The average number of wage earners employed in 1909, 1904, and 1899 is given for each state in Table 23. The sex and age distribution of the average number is not shown for the individual states, but Table 24 gives such a distribution of the number employed on December 15, or the nearest representative day. This table shows that the largest number of females employed as wage earners on the representative day, 254, was reported for the state of New York, and the next largest, 197, for Illinois.

Table 4

CLASS.	PERSONS ENGAGED IN THE PAINT AND VARNISH INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	21,896	19,496	2,400
Proprietors and officials.....	2,016	1,960	56
Proprietors and firm members.....	456	422	34
Salaried officers of corporations.....	793	773	20
Superintendents and managers.....	767	765	2
Clerks.....	5,640	4,436	1,204
Wage earners (average number).....	14,240	13,100	1,140
16 years of age and over.....	14,159	13,037	1,122
Under 16 years of age.....	81	63	18

In order to compare the distribution of persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 5.

Table 5 PERSONS ENGAGED IN THE PAINT AND VARNISH INDUSTRY.

CLASS.	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	21,896	100.0	16,480	100.0	32.9
Proprietors and firm members....	456	2.1	439	2.7	3.9
Salaried employees.....	7,200	32.9	4,408	26.7	63.3
Wage earners (average number)...	14,240	65.0	11,633	70.6	22.4

The largest increase, both absolute and relative, is shown for salaried employees.

Table 6 shows the average number of wage earners distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899.

The number of women 16 years of age and over formed a slightly smaller proportion of the average

number of wage earners in 1909 than in either 1904 or 1899, although the absolute number of women employed increased somewhat during each five-year period. The number of children employed is so small as to have little significance.

Table 6 AVERAGE NUMBER OF WAGE EARNERS IN THE PAINT AND VARNISH INDUSTRY.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	14,240	100.0	11,633	100.0	9,897	100.0
16 years of age and over..	14,159	99.4	11,584	99.6	9,642	99.4
Male.....	13,037	91.5	10,542	90.6	8,836	91.1
Female.....	1,122	7.9	1,042	9.0	806	8.3
Under 16 years of age....	81	0.6	49	0.4	55	0.6

Wage earners employed, by months.—Table 7 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 7 states in which an average of 500 or more wage earners were employed during the year.

Table 7 WAGE EARNERS EMPLOYED IN THE PAINT AND VARNISH INDUSTRY: 1909¹

STATE.	Average number during the year.	January	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		United States	14,240	13,223	13,835	14,360	14,635	14,692	14,582	14,202	14,141	14,236	14,444	14,296	14,231
Illinois.....	1,792	<i>1,601</i>	1,716	1,905	1,880	1,843	1,887	1,735	1,761	1,775	1,811	1,777	1,815
Michigan.....	1,024	<i>915</i>	977	1,006	1,033	1,065	1,049	1,042	988	1,044	1,060	1,059	1,048
Missouri.....	685	<i>492</i>	685	740	739	718	637	661	744	706	759	707	628
New Jersey.....	1,493	1,453	1,491	1,502	1,535	1,529	1,522	<i>1,434</i>	1,469	1,511	1,511	1,472	1,479
New York.....	3,047	2,908	2,931	3,024	3,048	3,073	3,073	3,068	3,095	3,072	3,106	3,137	3,063
Ohio.....	1,535	1,448	1,529	1,602	1,636	1,662	1,631	1,532	1,512	1,492	1,471	1,474	<i>1,431</i>
Pennsylvania.....	1,992	<i>1,888</i>	1,929	1,967	2,007	2,037	2,029	1,979	1,962	1,988	2,020	2,026	2,072

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed during any month of 1909 was 14,692 in May, and the smallest number was 13,223, in January, the minimum number being equal to 90 per cent of the maximum number. A comparison of the statistics for 1909 with those for 1904 shows very little change in the relative numbers employed for the several months. In 1904 the maximum number, 12,307, was reported for April, and the minimum number, 11,062, for January, the minimum being equal to 89.9 per cent of the maximum.

The months of maximum and minimum employment for 1909, and the number reported for these months is given for a larger number of states in Table 24.

Prevailing hours of labor.—In Table 8 the wage earners in the industry as a whole have been classified according to the hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few

employees worked a greater or smaller number of hours.

Table 8 AVERAGE NUMBER OF WAGE EARNERS IN THE PAINT AND VARNISH INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	14,240	656	2,332	2,601	4,681	3,440	67	463
Illinois.....	1,792	152	217	148	982	281	12	.....
Michigan.....	1,024	.....	25	634	69	296	.....	.....
Missouri.....	685	16	28	130	15	432	.....	64
New Jersey.....	1,493	93	480	28	282	364	17	229
New York.....	3,047	121	951	512	844	619	.....	.....
Ohio.....	1,535	53	267	198	520	497	.....	.....
Pennsylvania.....	1,992	49	90	326	1,127	345	38	17

Practically three-fourths (75.3 per cent) of the wage earners in 1909 worked in establishments where the prevailing hours of labor per week were from 54 to 60, inclusive. Only 21 per cent were employed in establishments where the usual hours were less than 54 per week. Of the seven groups of establishments

for which figures are given in Table 8, that employing the largest number of wage earners was the group of establishments reporting more than 54 but less than 60 hours per week as their prevailing hours of labor, these establishments giving employment to 4,681 wage earners, or 32.9 per cent of the total.

Character of ownership.—Table 9 presents statistics with respect to the character of ownership of the paint and varnish establishments in the United States.

The most important distinction shown is that between corporate and all other forms of ownership. Of the total number of establishments reported for the industry in 1909, 66.5 per cent were under corporate ownership. The corresponding figure for 1904 was 56.3 per cent. The value of the products of the establishments under corporate ownership represented 85.2 per cent of the total value of products for all es-

tablishments engaged in the industry in 1909 and 83.1 per cent in 1904.

CHARACTER OF OWNERSHIP.	PAINT AND VARNISH INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	791	639	\$124,889,422	\$90,839,609
Individual.....	160	160	7,536,788	6,460,167
Firm.....	105	119	11,002,823	8,906,163
Corporation.....	526	360	106,349,811	75,473,279
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	20.2	25.0	6.0	7.1
Firm.....	13.3	18.6	8.8	9.8
Corporation.....	66.5	56.3	85.2	83.1

Table 10 gives statistics for establishments classified according to form of ownership for the seven states employing an average of 500 or more wage earners in 1909.

STATE.	PAINT AND VARNISH INDUSTRY: 1909											
	Number of establishments owned by—			Wage earners in establishments owned by—			Value of product of establishments owned by—			Value added by manufacture in establishments owned by—		
	Indi-viduals.	Firms.	Corporations.	Indi-viduals.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.	Individu-als.	Firms.	Corporations.
United States	180	105	526	910	1,243	12,087	\$7,536,788	\$11,002,823	\$106,349,811	\$2,639,154	\$4,398,325	\$38,638,388
Illinois.....	10	5	59	115	67	1,610	675,344	502,894	19,256,053	258,466	206,403	7,067,811
Michigan.....	3	1	16	(X)	(X)	1,024	(X)	(X)	7,415,914	(X)	(X)	3,383,568
Missouri.....	2	1	29	3	(X)	682	13,176	(X)	6,814,572	5,140	(X)	2,124,347
New Jersey.....	12	7	44	60	314	1,119	654,862	2,101,079	10,010,988	254,106	749,206	3,537,644
New York.....	36	17	94	402	196	2,449	3,799,659	2,047,838	22,711,977	1,226,900	813,220	8,623,988
Ohio.....	14	9	64	27	28	1,480	194,005	222,045	13,201,139	83,195	104,573	4,859,375
Pennsylvania.....	38	24	52	176	199	1,617	1,184,661	1,535,211	11,299,872	552,232	647,538	3,618,980

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

Of the total number of wage earners employed in the industry in 1909, 910, or 6.4 per cent, were in establishments operated by individuals; 1,243, or 8.7 per cent, in those operated by firms; and 12,087, or 84.9 per cent, in those operated by corporations.

Size of establishments.—Table 11 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	PAINT AND VARNISH INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	791	639	\$124,889,422	\$90,839,609
Less than \$5,000.....	104	76	244,517	215,192
\$5,000 and less than \$20,000.....	175	151	2,034,695	1,678,523
\$20,000 and less than \$100,000.....	273	230	13,241,833	11,129,970
\$100,000 and less than \$1,000,000.....	213	186	65,259,238	47,942,835
\$1,000,000 and over.....	26	16	44,109,139	29,873,089
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	13.1	11.9	0.2	0.2
\$5,000 and less than \$20,000.....	22.1	23.6	1.6	1.8
\$20,000 and less than \$100,000.....	34.5	36.0	10.6	12.3
\$100,000 and less than \$1,000,000.....	26.9	28.0	52.3	52.8
\$1,000,000 and over.....	3.3	2.5	35.3	32.9

Of the 791 establishments engaged in the industry in 1909, 26 reported products valued at more than \$1,000,000; the corresponding figures for 1904 were 16 establishments out of 639. While establishments of this class constituted a comparatively small proportion of the total number of establishments—3.3 per cent in 1909 and 2.5 per cent in 1904—they reported a large proportion of the value of products—35.3 per cent in 1909 and 32.9 per cent in 1904. The great bulk of the products of the industry represented the output of establishments having products valued at \$100,000 or over, such establishments reporting 87.6 per cent of the total value of products in 1909 and 85.7 per cent in 1904. Although the average number of wage earners per establishment remained the same in 1909 as in 1904 (18), the average value of products per establishment increased from \$142,159 in 1904 to \$157,888 in 1909 and the average value added by manufacture from \$48,534 to \$57,995.

Table 12 classifies the establishments in the seven leading states according to the number of wage earners employed.

Table 12

STATE.	PAINT AND VARNISH INDUSTRY: 1909																
	Total.		Establishments employing—														
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		Over 500 wage earners.
Es-tab-lish-ments.	Wage earners (average number)	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States	791	14,340	38	411	1,017	181	2,056	78	2,551	38	2,588	31	4,882	2	715	1	631
Illinois.....	74	1,792	2	38	109	11	164	13	480	5	395	5	644				
Michigan.....	20	1,024	1	7	17	8	79	1	39			2	258			1	631
Missouri.....	32	685	1	13	25	13	147	2	64	1	64	1	127	1	258		
New Jersey.....	63	1,493	3	29	64	14	149	9	327	4	258	4	695				
New York.....	147	3,047	2	78	195	31	319	19	625	9	649	8	1,259				
Ohio.....	87	1,535	3	49	129	22	217	7	227			6	982				
Pennsylvania.....	114	1,992	8	64	133	31	335	9	207	9	544	2	316	1	457		

The table shows that from the standpoint of employment the majority of the establishments engaged in the industry are comparatively small. Of the 791 establishments reported, 4.8 per cent employed no wage earners, 52 per cent employed from 1 to 5, 24.1 per cent from 6 to 20, 10 per cent from 21 to 50, and 4.8 per cent from 51 to 100. There were 31 establishments that employed from 101 to 250 wage earners, and 3 establishments that employed over 250 wage earners.

Of the total number of wage earners reported, 21.6 per cent were in establishments employing from 1 to 20 wage earners, 17.9 per cent in establishments employing from 21 to 50, 18.2 per cent in establishments employing from 51 to 100, and 42.3 per cent in the 34 establishments employing more than 100 wage earners.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 13 shows, in percentages, for 1909, the distribution of these expenses among the classes indicated for the paint and varnish industry as a whole and for each branch separately.

Table 13

BRANCH OF INDUSTRY	PER CENT OF TOTAL EXPENSES REPORTED.			
	Salaries.	Wages.	Materials.	Miscellaneous expenses.
The industry as a whole.....	9.3	7.4	71.1	12.2
Paint.....	7.8	7.9	73.7	10.6
Varnish.....	14.3	6.8	62.7	17.2

In Table 24 the amounts paid in 1909 for the various items of expense reported are given by states for the industry as a whole. The highest proportion of the total reported expenses represented by cost of materials for any of the nine leading states was that for California and the lowest that for Michigan.

The miscellaneous expenses reported for the industry in 1909, as shown in Table 24, amounted to

\$13,537,779. Of this amount, \$494,331, or 3.7 per cent, was paid for the rent of factories; \$483,420, or 3.6 per cent, for taxes; \$91,549, or seven-tenths of 1 per cent, for contract work; and \$12,468,479, or 92.1 per cent, for other miscellaneous expenses.

Engines and power.—The amount of power used in the industry, as shown in Table 2, increased from 7,487 horsepower in 1869 to 56,162 horsepower in 1909. Table 14 shows the statistics of power as reported at the censuses of 1909, 1904, and 1899.

Table 14

POWER.	PAINT AND VARNISH INDUSTRY.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	1,378	781	517	56,162	41,288	30,443	100.0	100.0	100.0
Owned.....	651	572	517	47,487	37,622	28,666	84.6	91.1	94.2
Steam.....	510	456	460	42,166	34,952	26,890	75.1	84.7	88.3
Gas.....	110	87	28	3,290	1,673	501	5.9	4.1	1.6
Water wheels.....	30	22	29	2,004	969	950	3.6	2.3	3.1
Water motors.....	1	7	(¹)	2	28	(¹)	(²)	0.1	.....
Other.....				25		325	(²)	.....	1.1
Rented.....	727	209	(¹)	8,675	3,666	1,777	15.4	8.9	5.8
Electric.....	727	209	(¹)	7,814	2,650	856	13.9	6.4	2.8
Other.....				861	1,016	921	1.5	2.5	3.0
Electric motors.....	1,353	515	92	17,037	7,540	1,788	100.0	100.0	100.0
Run by current generated by establishment.....	626	306	92	9,223	4,890	932	54.1	64.9	52.1
Run by rented power.....	727	209	(¹)	7,814	2,650	856	45.9	35.1	47.9

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power used in the paint and varnish industry increased 25,719 horsepower, or 84.5 per cent, from 1899 to 1909. The greater part of the increase was in steam and rented electric power. In 1909, as in 1904 and 1899, steam power formed the major part of the primary power employed in the industry, but despite the increase of 56.8 per cent for the decade, its relative importance has decreased considerably since 1899. In that year such power formed 88.3 per cent of the total primary power; in 1904 the proportion was 84.7 per cent; and in 1909 it was 75.1 per cent. There has been a marked increase in the use

of power generated by gas and other internal combustion engines and of rented electric power.

The practice of using electric motors for the distribution of power by means of current generated in the establishments reporting has also increased rapidly, the horsepower of such motors being nearly ten times

as great in 1909 as in 1899 (9,223, as compared with 932).

Table 15 shows for 1909 the amount of each of the several kinds of power and of the different kinds of fuel used in the industry for seven of the leading states.

Table 15

STATE.	PAINT AND VARNISH INDUSTRY: 1909																
	Primary horsepower.								Electric horsepower.		Fuel used.						
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States.....	672	58,162	47,487	42,166	3,290	2,008	25	7,814	861	17,037	9,223	66,597	299,930	24,667	1,318	19,613	269,367
Illinois.....	66	7,108	6,524	6,221	298	.....	5	574	10	3,196	2,622	378	55,018	3,988	178	2,736	8,729
Michigan.....	16	2,362	2,098	2,098	.....	.....	.....	244	20	419	375	31	17,827	2,040	.....	50	631
Missouri.....	28	2,706	2,335	2,331	4	.....	.....	371	.....	.....	90	2	20,414	310	30	49	3,061
New Jersey.....	49	5,924	5,203	5,129	45	29	.....	721	.....	1,875	1,154	17,903	42,371	1,581	3	13	1,054
New York.....	126	10,857	8,882	8,133	259	475	15	1,412	563	3,200	1,788	37,408	23,408	4,518	11	331	8,634
Ohio.....	74	5,572	4,666	3,337	1,329	.....	.....	896	10	2,548	1,652	1	29,040	6,523	64	24	32,702
Pennsylvania.....	98	9,862	9,399	7,567	1,012	820	.....	377	86	1,112	735	9,821	70,635	1,948	667	447	181,924
All other states.....	215	11,771	8,380	7,350	343	682	5	3,219	172	4,687	807	1,053	40,717	3,759	365	15,963	32,632

Fuel consumed.—Bituminous coal is the principal kind of fuel used, 299,930 tons having been consumed

in 1909. Considerable natural gas was used by the establishments in Pennsylvania and Ohio.

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

Materials.—The more important materials used in the manufacture of paint and varnish are lead in the form of pig lead or as oxides and white lead, zinc white, iron oxides and other earth colors, barytes, dry colors, gums, and solvents or vehicles such as linseed oil, turpentine, benzine, and wood and grain alcohol. Pig lead and wood and grain alcohol were the only materials concerning which a separate statement was called for on the census schedule. The total quantities and cost of these materials used in the manufacture of paint and varnish in all establishments, including those primarily engaged in other industries, are given in Table 16 for 1909, 1904, and 1899.

wood alcohol, 327.6 per cent; and that of grain alcohol, 354.9 per cent. Grain alcohol formed approximately one-fifth of the total quantity of alcohol used in the manufacture of paint and varnish in 1909 and 1899, but a considerably smaller proportion in 1904.

The cost of all materials used in the combined industry as given in Table 23 was \$79,016,000 in 1909, \$59,827,000 in 1904, and \$44,739,000 in 1899, the increase for the decade 1899–1909 being 76.6 per cent.

The quantity and cost of the pig lead and the alcohol used as materials in establishments manufacturing paint or varnish as their product of chief value in 1909 are given in Table 17, by states.

MATERIAL.	PIG LEAD AND ALCOHOL USED IN THE MANUFACTURE OF PAINT AND VARNISH.		
	1909 ¹	1904 ²	1899
Pig lead:			
Tons of 2,000 pounds.....	150,163	129,629	99,052
Cost.....	\$12,380,624	\$11,214,961	\$8,585,688
Alcohol:			
Gallons.....	1,682,032	1,416,746	388,368
Cost.....	\$920,086	\$928,946	\$461,417
Wood—			
Gallons.....	1,325,807	1,357,682	310,059
Cost.....	\$693,362	\$790,243	\$285,510
Grain—			
Gallons.....	356,225	89,064	78,309
Cost.....	\$226,724	\$138,703	\$175,907

¹ Includes the following materials used in establishments engaged primarily in the manufacture of products other than paint and varnish: Pig lead, 1,072 tons, valued at \$93,418; wood alcohol, 25,833 gallons, valued at \$12,769; and grain alcohol, 34,758 gallons, valued at \$14,462.

² Includes the following materials used in establishments engaged primarily in the manufacture of products other than paint and varnish: Pig lead, 1,116 tons, valued at \$95,559; wood alcohol, 91,966 gallons, valued at \$50,816; and grain alcohol, 1,381 gallons, valued at \$4,299.

The quantity of pig lead used in the manufacture of paint and varnish in all establishments increased 51.6 per cent during the decade 1899–1909; that of

STATE.	PIG LEAD AND ALCOHOL USED IN THE PAINT AND VARNISH INDUSTRY: 1909.					
	Pig lead.		Alcohol.			
	Quantity (tons of 2,000 pounds).	Cost.	Wood.		Grain.	
			Quantity (gallons).	Cost.	Quantity (gallons).	Cost.
United States.....	149,091	\$12,287,106	1,299,974	\$650,603	321,467	\$212,262
California.....	5,220	441,168	10,686	4,908	37,877	16,126
Connecticut.....	.....	.....	38,937	18,473	2,797	1,149
Illinois.....	26,204	2,242,307	120,131	87,792	85,050	76,073
Indiana.....	.....	.....	742	474	2,755	1,247
Kentucky.....	.....	.....	1,080	621	2,808	1,236
Massachusetts.....	2,122	190,364	42,395	21,840	16,454	7,268
Michigan.....	1,126	97,039	846,035	462,062	3,630	4,074
Minnesota.....	.....	.....	12,001	5,542	3,000	4,470
Missouri.....	17,218	1,484,840	3,877	1,955	3,128	2,145
Nebraska.....	4,246	365,665	150	79	6,100	2,930
New Jersey.....	12,151	807,317	28,794	15,047	86,128	30,515
New York.....	36,203	2,733,997	101,669	49,906	46,520	23,381
Ohio.....	17,270	1,498,241	9,305	4,738	9,748	4,911
Pennsylvania.....	27,263	2,419,104	47,411	25,786	27,601	28,787
Rhode Island.....	75	6,639	17,253	7,141	6,515	4,405
Wisconsin.....	1	145	17,150	3,132	5,260	2,295
All other states.....	2	280	2,358	1,207	6,200	3,050

Products.—Table 18 gives a detailed statement of the products of the industry for 1909, 1904, and 1899.

PRODUCT.	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY.		
	1909	1904	1899
Total value ¹	\$124,889,422	\$90,839,609	\$69,562,235
Pigments.....	\$16,985,588	\$11,965,806	\$13,319,487
White lead, dry—			
Pounds.....	85,234,414	62,395,868	116,102,316
Value.....	\$3,921,803	\$2,877,109	\$4,211,181
Oxides of lead—			
Pounds.....	63,404,846	49,734,330	50,759,623
Value.....	\$3,662,062	\$2,591,772	\$2,550,340
Lamp black and other blacks—			
Pounds.....	1,810,445	757,244	1,065,000
Value.....	\$105,063	\$49,869	\$60,250
Iron oxides and other earth colors—			
Pounds.....	111,674,675	48,345,978	33,453,896
Value.....	\$876,331	\$331,416	\$318,242
Other dry colors, including vermilion and other fine colors—			
Pounds.....	162,409,565	98,194,081	167,479,090
Value.....	\$6,874,333	\$5,066,083	\$5,317,943
Barytes—			
Pounds.....	49,496,025	22,299,980	134,174
Value.....	\$268,757	\$134,174	
Pulp colors, sold moist—			
Pounds.....	28,435,722	25,351,515	20,060,935
Value.....	\$1,277,239	\$915,383	\$861,531
Paints in oil.....	\$56,763,296	\$40,390,059	(³)
White lead in oil—			
Pounds.....	246,567,570	216,496,450	(³)
Value.....	\$15,234,411	\$11,228,889	(³)
Paste—			
Pounds.....	162,356,330	131,940,464	306,410,398
Value.....	\$11,279,459	\$8,713,183	\$17,601,459
Already mixed for use—			
Gallons.....	33,272,033	22,379,020	16,879,595
Value.....	\$30,249,426	\$20,447,987	\$14,864,126
Varnishes and japans.....	\$31,262,535	\$22,871,486	\$18,502,219
Oleoresinous varnishes—			
Gallons.....	18,476,523	17,162,719	14,282,851
Value.....	\$17,350,113	\$15,702,997	\$14,333,554
Dammur and similar turpentine and benzine varnishes—			
Gallons.....	3,481,231		
Value.....	\$2,836,341		
Spirit varnishes, other than turpentine—			
Gallons.....	1,181,746	1,553,562	549,811
Value.....	\$1,408,048	\$2,180,713	\$905,229
Pyroxylin varnishes—			
Gallons.....	1,880,141	148,320	160,127
Value.....	\$2,351,425	\$162,163	\$178,826
Dryers, japans, and lacquers—			
Gallons.....	9,474,939	(³)	(³)
Value.....	\$5,094,973	\$3,346,355	\$3,084,610
All other.....	\$2,221,635	\$1,479,258	(³)
Fillers.....	\$3,126,271	\$2,344,636	(³)
Liquid—			
Gallons.....	1,159,569	1,051,148	(³)
Value.....	\$823,063	\$785,617	(³)
Paste—			
Pounds.....	14,050,329		
Value.....	\$887,948		
Dry—			
Pounds.....	50,983,472	68,761,174	(³)
Value.....	\$295,728	\$1,559,019	(³)
Putty—			
Pounds.....	63,502,048		
Value.....	\$1,119,532		
Water paints and kalsomine:			
Dry or in paste—			
Pounds.....	47,465,265	27,932,447	(³)
Value.....	\$1,917,038	\$924,807	(³)
Already mixed for use—			
Gallons.....	522,283	123,400	(³)
Value.....	\$61,969	\$9,230	(³)
Linseed oil:			
Gallons.....	3,477,004	(³)	(³)
Value.....	\$1,912,594	(³)	(³)
Bleached shellac:			
Pounds.....	3,014,195	(³)	(³)
Value.....	\$578,650	(³)	(³)
All other products.....	\$12,281,481	\$12,333,585	\$5,274,944

¹ In addition, paint and varnish products to the value of \$2,583,397 in 1909, \$1,221,338 in 1904, and \$3,936,751 in 1899 were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

² Includes white lead in oil.

³ Figures not available.

During the period 1899-1909 the value of all products of the industry increased from \$69,562,235 to \$124,889,422, or 79.5 per cent, the rate of increase for the first half of the decade being 30.6 per cent, and that for the last half 37.5 per cent. The value of pigments

and paints produced in 1909 was \$73,748,884, representing an increase of 61.1 per cent as compared with the figure for 1899 (\$45,785,072), while the relative increase in value for varnishes and japans during the decade was 69 per cent. The quantity of pyroxylin varnishes made in 1909 was more than eleven times as great as in 1899, and large relative gains are shown also for iron oxides and other earth colors, for spirit varnishes other than turpentine, and for ready mixed paints.

Table 19 gives statistics in regard to products made in establishments in the paint and varnish industry for use in further processes of manufacture in the establishment where produced.

PRODUCT.	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY CONSUMED IN THE ESTABLISHMENTS WHERE PRODUCED.	
	1909	1904
White lead, dry.....pounds..	162,702,089	122,288,484
Lead oxides.....pounds..	4,526,425	13,589,147
Varnishes.....gallons..	4,407,312	1,202,674
Drying japans and dryers.....gallons..	3,090,756	988,979
Collodion and other cellulose nitrate solutions.....gallons..	20,600	1,576,442
Pyroxylin and other cellulose nitrates.....pounds..	24,750	12,000
Coppers.....pounds..	11,531,006	

Table 18 covers only the products of establishments engaged primarily in the manufacture of paint and varnish. The quantity and value of these specific products reported by all establishments manufacturing paint and varnish, including those reporting them as subsidiary products, are given in greater detail for 1909 in Table 20.

PRODUCT.	PRODUCTS OF ALL ESTABLISHMENTS MANUFACTURING PAINT AND VARNISH.	
	Quantity.	Value.
Pigments:	Pounds.	
White lead, dry.....	85,269,414	\$3,924,528
Oxides of lead.....	65,767,254	3,798,551
Lamp black and other blacks.....	1,811,445	105,174
Iron oxides and other earth colors.....	213,285,734	1,085,438
Vermilion.....	259,558	107,472
Fine colors, other than vermilion.....	8,420,120	1,052,443
Other dry colors.....	161,902,137	6,418,554
Barytes.....	56,254,838	348,470
Pulp colors, sold moist.....	28,600,222	1,294,239
Paints in oil:		
White lead in oil.....	246,569,970	15,234,539
Paste.....	165,038,353	11,435,937
Gallons.....		
Already mixed for use.....	34,278,989	30,710,063
Varnishes and japans:		
Oleoresinous varnishes.....	18,692,527	17,559,898
Dammur and similar turpentine and benzine varnishes.....	3,483,994	2,839,534
Spirit varnishes, other than turpentine.....	1,273,411	1,502,398
Pyroxylin varnishes.....	1,886,541	2,356,692
Drying japans and dryers.....	6,638,706	3,165,589
Baking japans and lacquers.....	2,983,285	2,079,927
All other.....	4,265,298	2,254,697
Fillers:		
Liquid.....	1,166,533	828,393
Paste.....	14,164,923	903,867
Dry.....	50,983,472	295,728
Putty.....	67,767,348	1,169,683
Water paints and kalsomine:		
Dry or in paste.....	47,465,715	1,917,047
Gallons.....		
Already mixed for use.....	543,733	64,114
Linseed oil:		
Raw.....	2,098,696	1,106,181
Boiled.....	1,379,025	806,846
Pounds.....		
Bleached shellac.....	3,905,593	772,240

Table 21 shows separately the paint and varnish products of establishments engaged primarily in the manufacture of other products.

Table 21	PRODUCT.	PAINT AND VARNISH PRODUCTS OF ESTABLISHMENTS ENGAGED PRIMARILY IN THE MANUFACTURE OF PRODUCTS OTHER THAN PAINT AND VARNISH.		PRODUCT.	PAINT AND VARNISH PRODUCTS OF ESTABLISHMENTS ENGAGED PRIMARILY IN THE MANUFACTURE OF PRODUCTS OTHER THAN PAINT AND VARNISH.	
		Quantity.	Value.		Quantity.	Value.
	Pigments:	<i>Pounds.</i>		Varnishes and japans—Continued.	<i>Gallons.</i>	
	White lead, dry.....	35,000	\$2,725	Spirit varnishes, other than turpentine.....	91,665	\$94,350
	Oxides of lead.....	2,362,408	136,489	Pyroxylin varnishes.....	6,400	5,267
	Lamp black and other blacks.....	1,000	111	Drying japans and dryers.....	138,307	146,024
	Iron oxides and other earth colors.....	101,611,059	209,107	Baking japans and lacquers.....	8,745	4,519
	Other dry colors, including vermilion and other fine colors.....	8,172,250	704,136	All other.....	27,201	33,062
	Barytes.....	6,758,813	79,713	Fillers:		
	Pulp colors, sold moist.....	164,500	17,000	Liquid.....	6,964	5,330
	Paints in oil:			Paste.....	114,594	15,919
	White lead in oil.....	2,400	128	Putty.....	4,265,300	50,151
	Paste.....	2,682,023	156,478	Water paints and kalsomine:		
	Already mixed for use.....	1,006,956	460,637	Dry or in paste.....	450	9
	Varnishes and japans:			Already mixed for use.....	21,450	2,145
	Oleoresinous varnishes.....	216,004	209,785	Linseed oil.....	717	433
	Dammar and similar turpentine and benzine varnishes.....	2,763	3,193	Bleached shellac.....	891,398	193,590

The production of lamp black and other blacks by factories in the paint and varnish industry (1,811,445 pounds, valued at \$105,174 in 1909) forms only a small part of the total output of such pigments. In 1909 there were 27 establishments engaged primarily in the manufacture of "bone, carbon, and lamp black," with products valued at \$1,093,494, including subsidiary products other than blacks valued at \$21,000. In addition, black pigments valued at \$961,995 were reported as subsidiary products of establishments in the

fertilizer and glue industries. The value of the production of bone, carbon, and lamp black by all classes of establishments in 1909 was \$2,139,663. The quantity was not reported in all cases, but on the basis of the average value per pound (4.66 cents) as computed from the returns of the establishments reporting quantities, the total production is estimated at 45,900,000 pounds.

Table 22 shows in detail, by states, the products of establishments engaged primarily in the manufacture of paint and varnish for 1909.

Table 22	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY: 1909		PRODUCT AND STATE.	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY: 1909		PRODUCT AND STATE.	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY: 1909	
	Quantity.	Value.		Quantity.	Value.		Quantity.	Value.
	<i>Pounds.</i>		Pigments—Continued.	<i>Pounds.</i>		Paints in oil—Continued.	<i>Gallons.</i>	
	\$18,985,588		Barytes.....	49,498,025	\$288,757	Already mixed for use.....	33,272,033	\$30,249,428
	White lead, dry.....	85,234,414	Missouri.....	13,980,000	118,075	California.....	1,185,709	1,033,071
	Illinois.....	13,832,932	New York.....	4,393,000	23,167	Illinois.....	5,879,258	5,115,977
	Missouri.....	4,352,226	All other states.....	31,123,025	127,515	Kentucky.....	853,749	694,916
	New Jersey.....	16,958,467	Pulp colors, sold moist.	28,435,722	1,277,239	Maryland.....	783,025	682,400
	New York.....	12,173,520	Massachusetts.....	880,000	74,366	Massachusetts.....	482,040	522,782
	Ohio.....	11,808,277	New Jersey.....	3,240,000	203,933	Michigan.....	2,184,513	1,836,317
	Pennsylvania.....	18,414,107	New York.....	14,020,581	672,111	Minnesota.....	893,986	952,472
	All other states.....	7,694,885	Pennsylvania.....	6,158,396	209,200	Missouri.....	1,921,398	1,732,643
	Oxides of lead.	63,404,848	All other states.....	4,136,745	117,623	Nebraska.....	370,631	403,575
	California.....	1,052,125				New Jersey.....	2,584,449	2,481,925
	Illinois.....	3,775,530	Paints in oil.....	56,763,298		New York.....	3,331,091	3,618,181
	Missouri.....	3,013,155	White lead in oil.....	246,587,570	15,234,411	Ohio.....	6,769,267	5,334,914
	New York.....	20,180,006	California.....	12,987,067	806,699	Pennsylvania.....	3,083,623	2,708,202
	Ohio.....	4,399,502	Illinois.....	53,053,691	3,397,795	Wisconsin.....	811,194	828,847
	Pennsylvania.....	21,496,303	Massachusetts.....	3,834,462	218,994	All other states.....	2,138,200	2,303,204
	All other states.....	9,488,225	Missouri.....	40,755,680	2,410,387	Varnishes and japans.....	31,262,535	
	Lamp black and other blacks.	1,810,445	New Jersey.....	3,713,557	253,308	Oleoresinous varnishes.....	18,476,523	17,350,113
	Iron oxides and other earth colors.....	111,674,676	New York.....	62,973,138	3,765,227	Connecticut.....	112,273	225,846
	California.....	1,291,000	Ohio.....	24,057,629	1,532,797	Illinois.....	2,523,772	2,543,232
	Maryland.....	1,679,100	Pennsylvania.....	32,401,207	1,995,179	Indiana.....	458,412	453,060
	New Jersey.....	4,133,200	All other states.....	12,791,239	854,022	Kentucky.....	629,944	219,333
	New York.....	11,919,174	Paste.....	162,356,330	11,279,459	Massachusetts.....	477,431	496,897
	Pennsylvania.....	62,626,369	California.....	7,141,323	563,950	Michigan.....	1,565,764	2,298,995
	Tennessee.....	13,033,500	Illinois.....	24,459,446	1,669,315	Minnesota.....	181,675	172,672
	Wisconsin.....	14,155,000	Kentucky.....	2,880,641	407,703	Missouri.....	202,925	195,680
	All other states.....	3,037,332	Maryland.....	2,006,782	119,283	New Jersey.....	2,614,152	3,325,912
	Other dry colors¹	162,409,685	Massachusetts.....	4,040,760	294,686	New York.....	6,199,289	4,328,544
	Connecticut.....	1,046,776	Michigan.....	16,664,603	849,998	Ohio.....	3,790,073	2,413,323
	Illinois.....	50,172,924	Missouri.....	11,259,851	670,988	Pennsylvania.....	397,010	356,105
	Kansas.....	4,980,967	New Jersey.....	14,858,470	891,493	All other states.....	423,903	320,514
	Massachusetts.....	1,876,776	New York.....	21,453,365	2,274,401	Dammar and similar turpentine and benzine varnishes.	3,481,231	2,836,341
	Missouri.....	6,584,490	Ohio.....	12,237,952	807,156	California.....	78,101	97,365
	New Jersey.....	30,142,996	Pennsylvania.....	29,741,101	1,609,481	Illinois.....	432,546	467,905
	New York.....	44,639,112	Wisconsin.....	4,356,678	347,833	Indiana.....	147,241	65,770
	Pennsylvania.....	16,347,876	All other states.....	11,256,460	773,272	Kentucky.....	665,198	451,661
	All other states.....	6,617,660						

¹ Including vermilion and other fine colors.

Table 22—Continued.

PRODUCT AND STATE.	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY: 1909		PRODUCT AND STATE.	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY: 1909		PRODUCT AND STATE.	PRODUCTS OF THE PAINT AND VARNISH INDUSTRY: 1909	
	Quantity.	Value.		Quantity.	Value.		Quantity.	Value.
Varnishes and japans—Continued.			Varnishes and japans—Continued.			Fillers—Continued.		
<i>Dummar and similar turpentine and benzine varnishes—Continued.</i>	<i>Pounds.</i>		<i>All other—Continued.</i>	<i>Pounds.</i>		<i>Putty—Continued.</i>	<i>Pounds.</i>	
Massachusetts.....	68,920	\$59,488	Illinois.....	364,045	\$232,704	Ohio.....	2,313,450	\$40,905
Michigan.....	75,245	74,936	Massachusetts.....	89,890	84,328	Pennsylvania.....	7,381,433	138,850
Missouri.....	89,750	85,917	Michigan.....	483,009	131,299	Wisconsin.....	3,807,788	53,268
New Jersey.....	815,905	685,968	Missouri.....	80,325	56,838	All other states.....	3,930,828	73,740
New York.....	277,667	221,343	New Jersey.....	39,811	34,844	Water paints and kalsomina.....		1,979,007
Ohio.....	309,080	259,204	New York.....	2,196,435	1,084,033	<i>Dry or in paste.....</i>	47,485,265	1,917,038
Pennsylvania.....	502,987	309,029	Ohio.....	401,757	190,346	California.....	347,351	54,062
All other states.....	178,531	107,857	New York.....	183,531	170,121	Illinois.....	9,081,330	449,799
<i>Spirit varnishes, other than turpentine.....</i>	1,181,748	1,403,048	Pennsylvania.....	119,507	71,844	Michigan.....	3,955,395	98,929
California.....	53,133	52,589	Fillers.....		3,126,271	New Jersey.....	5,851,765	345,988
Illinois.....	483,227	569,600	<i>Liquid.....</i>	1,159,569	823,063	New York.....	25,490,405	856,159
Indiana.....	5,765	15,169	California.....	64,014	31,669	Pennsylvania.....	1,263,020	59,529
Massachusetts.....	87,475	77,278	Connecticut.....	92,000	13,100	All other states.....	1,476,009	52,572
Missouri.....	16,650	21,603	Illinois.....	92,341	80,282	<i>Already mixed for use.....</i>	Gallons.	522,283
New Jersey.....	60,376	84,462	Indiana.....	20,711	15,020	Linseed oil.....	3,477,004	1,912,594
New York.....	253,266	306,681	Massachusetts.....	18,327	11,614	<i>Raw.....</i>	2,098,014	1,105,772
Ohio.....	77,786	106,848	Michigan.....	160,349	99,823	<i>Boiled.....</i>	1,378,890	806,822
Pennsylvania.....	72,567	93,945	Missouri.....	39,550	26,152	New York.....	1,436,964	781,731
All other states.....	71,501	79,973	New Jersey.....	31,667	31,076	Pennsylvania.....	1,347,959	712,692
<i>Pyroxylin varnishes.....</i>	1,980,141	2,351,425	Ohio.....	201,232	189,561	All other states.....	692,081	418,271
New Jersey.....	125,670	233,322	Ohio.....	292,867	155,869	Bleached shellac.....	3,014,195	578,650
New York.....	372,689	422,550	Pennsylvania.....	163,238	119,223	New York.....	1,739,727	368,253
Pennsylvania.....	56,808	85,269	All other states.....	57,273	49,674	All other states.....	1,274,468	210,397
All other states.....	1,324,974	1,610,284	<i>Paste.....</i>	14,050,329	887,948	All other products, including custom work.....		12,281,481
<i>Driers, japans, and lacquers.....</i>	9,474,939	5,084,973	Illinois.....	3,250,327	151,191	California.....	462,510	1,562,172
California.....	209,329	109,737	Indiana.....	554,494	45,962	Illinois.....	1,562,172	71,918
Connecticut.....	171,661	252,559	Michigan.....	1,275,696	89,780	Kentucky.....	86,866	922,668
Illinois.....	1,171,565	682,261	New York.....	1,788,989	165,422	Massachusetts.....	178,325	1,319,140
Indiana.....	278,217	70,926	Ohio.....	2,289,914	118,515	Michigan.....	516,397	224,077
Kentucky.....	218,112	86,866	Pennsylvania.....	1,617,267	91,304	Minnesota.....	356,180	697,559
Massachusetts.....	178,325	89,979	All other states.....	3,273,642	225,774	Missouri.....	677,516	142,167
Michigan.....	516,397	215,961	<i>Dry.....</i>	50,983,472	295,728	New Jersey.....	1,646,881	485,569
Missouri.....	356,180	153,823	<i>Putty.....</i>	63,602,048	1,119,532	New York.....	1,715,173	3,331,522
New Jersey.....	677,516	645,685	California.....	3,928,190	94,084	Ohio.....	2,199,656	862,420
New York.....	1,646,881	1,276,148	Illinois.....	12,604,189	165,180	Pennsylvania.....	135,927	1,625,481
Ohio.....	1,715,173	672,443	Maryland.....	3,548,931	61,890	Rhode Island.....	161,487	138,349
Pennsylvania.....	2,199,656	800,082	Massachusetts.....	4,633,361	83,724	Connecticut.....	112,700	102,364
All other states.....	135,927	38,503	Michigan.....	3,163,957	48,550			
<i>All other.....</i>	4,239,097	2,221,635	Minnesota.....	1,358,740	21,932			
California.....	161,487	53,414	Missouri.....	2,070,000	32,170			
Connecticut.....	112,700	102,364	New Jersey.....	3,403,706	59,747			
			New York.....	11,347,425	245,492			

DETAILED STATE TABLES.

The principal statistics secured from the census inquiry concerning the paint and varnish industry are presented, by states, in Tables 23 and 24.

Table 23 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the

industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 24 gives more detailed statistics for the industry for 1909 only.

SULPHURIC, NITRIC, AND
MIXED ACID

THE MANUFACTURE OF SULPHURIC, NITRIC, AND MIXED ACIDS.

GENERAL STATISTICS.

Scope of the industry.—The segregation under a separate classification of establishments engaged primarily in the manufacture of sulphuric acid, nitric acid, and mixed acids (the latter being mixtures of sulphuric and nitric acids in various proportions) was first made at the census of 1904. At prior censuses such establishments were included under the classification "chemicals"; the returns for 1899, however, were so recorded that it has been possible to separate the statistics for establishments manufacturing these products from those engaged primarily in the manufacture of other acids and chemicals, so that the totals for that census may be placed in comparison with those for 1909 and 1904. Although the statistics here presented pertain to establishments manufacturing sulphuric, nitric, and mixed acids as chief products, additional statistics are given in certain of the tables showing the total production of these acids by all establishments, including those engaged primarily in the manufacture of fertilizers and explosives and those refining petroleum.

Comparison with earlier censuses.—Table 1 summarizes the statistics of the industry for 1909, 1904, and 1899.

At the census of 1909, 42 establishments were reported as engaged primarily in the manufacture of

sulphuric, nitric, and mixed acids, these establishments giving employment to 2,502 persons, of whom 2,252 were wage earners, and paying out \$1,494,894 in wages. The value of their products was \$9,884,057, the cost of the materials used, \$5,385,828, and the value added by manufacture, \$4,498,229, the cost of materials being equal to 54.5 per cent of the value of products.

Table 1

	SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY.					
	Number or amount.			Per cent of increase. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments..	42	32	34	23.5	31.2	-5.9
Persons engaged in the industry.....	2,582	2,757	2,654	-2.7	-6.3	3.9
Proprietors and firm members.....	2	2	(²)			
Salaried employees.....	330	308	298	10.7	7.1	3.4
Wage earners (average number).....	2,252	2,447	2,356	-4.4	-8.0	3.9
Primary horsepower.....	6,494	5,416	(³)		19.9	
Capital.....	\$18,726,195	\$12,761,920	\$13,981,506	33.9	46.7	-8.7
Expenses.....	8,347,722	7,747,303	6,164,111	35.4	7.8	25.7
Services.....	2,045,894	2,061,512	1,715,895	19.2	-0.8	20.1
Salaries.....	651,000	556,106	358,346	41.9	-0.9	43.2
Wages.....	1,494,894	1,505,406	1,357,549	12.6	-0.7	13.4
Materials.....	5,385,828	4,972,838	4,053,238	33.5	8.3	23.3
Miscellaneous.....	916,000	712,953	414,978	120.7	28.5	71.8
Value of products.....	9,884,057	9,052,646	8,596,390	15.0	9.2	5.3
Value added by manufacture (value of products less cost of materials).....	4,498,229	4,079,808	4,563,152	-1.4	10.3	-10.6

¹ A minus sign (-) denotes decrease. ² Comparable figures not available.

Table 2

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.						WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.			
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.		Total.	16 and over.			Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.	Female.		Male.	Female.	
								Maximum month.							Minimum month.
United States.....	42	2,582	108	190	34	2,252	Oc 2,327	Ap 2,129	2,332	2,328	1	3	6,494		
California.....	6	247	11	16	3	217	Fe 230	Au 203	210	210			735		
Connecticut.....	3	128	5	11	1	111	No 125	Jy 101	122	122			337		
New Jersey.....	6	494	19	33	8	434	No 475	Fe 395	452	452			1,575		
Ohio.....	4	148	8	10	1	129	Se 162	Ja 101	121	121			213		
Pennsylvania.....	6	172	11	22	7	132	Mh 149	Au 121	155	151	1	3	286		
All other states ¹	17	1,393	52	98	14	1,229			1,272	1,272			3,348		

STATE.	Capital.	EXPENSES.										Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.			Value of products.		
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States.....	\$18,726,195	\$8,347,722	\$311,573	\$239,427	\$1,494,894	\$520,034	\$4,865,744	\$4,525	\$85,620	\$212	\$825,643	\$9,884,057	\$4,498,229
California.....	2,614,500	1,112,402	38,020	19,205	172,864	105,811	634,504		8,889		133,109	1,160,937	420,622
Connecticut.....	998,270	460,435	12,350	11,362	69,279	36,680	287,396		3,460	183	39,725	497,688	173,612
New Jersey.....	3,450,357	1,631,720	62,460	42,682	281,437	103,622	958,602		17,045		165,872	2,127,637	1,065,413
Ohio.....	574,391	394,571	17,367	12,268	82,350	20,238	228,339		3,276		30,733	417,702	169,125
Pennsylvania.....	1,142,636	506,459	17,060	27,848	87,240	29,196	298,797		5,353		40,965	624,473	296,480
All other states ¹	9,946,041	4,242,135	164,316	126,062	801,724	224,537	2,458,106	4,525	47,597	29	415,239	5,055,620	2,372,977

¹ All other states embrace: Colorado, 1 establishment; Illinois, 2; Kansas, 1; Louisiana, 1; Maryland, 3; Massachusetts, 1; Michigan, 1; New York, 4; Tennessee, 1; and Virginia, 2.

In comparing the figures in Table 1 for different censuses, it should be borne in mind that large quantities of sulphuric, nitric, and mixed acids are used in the manufacture of fertilizers and explosives and in other industries, and that variations from census to census in the relative extent to which the establishments in these industries manufacture the acids which they use as materials affect the figures for the establishments engaged in the manufacture of these acids as primary products.

During the decade 1899-1909 the value of products increased 15 per cent, but the average number of wage earners and value added by manufacture decreased 4.4 per cent and 1.4 per cent, respectively, all of the decrease in the former item taking place during the second half of the decade, and all of that in the latter item taking place in the first half of the decade.

Summary, by states.—Table 2 gives in detail the principal statistics of the manufacture of sulphuric, nitric, and mixed acids, by states, for 1909.

New Jersey was the leading state in 1909 in average number of wage earners, value of products, and value added by manufacture. In three of the four remaining states for which totals are presented, the value of products increased between 1904 and 1909, and in one (Ohio) it decreased. The states of Colorado, Illinois, Kansas, Maryland, and New York, included under "all other states," were large producers of sulphuric, nitric, and mixed acids.

Persons engaged in the industry: 1909.—Table 3 shows for 1909 the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	2,582	2,547	35
Proprietors and officials.....	106	106	.....
Proprietors and firm members.....	.....	.....	.....
Salaried officers of corporations.....	27	27	.....
Superintendents and managers.....	79	79	.....
Clerks.....	224	190	34
Wage earners (average number).....	2,252	2,251	1
16 years of age and over.....	2,249	2,248	1
Under 16 years of age.....	3	3	.....

The average number of persons engaged in the manufacture of sulphuric, nitric, and mixed acids in 1909 was 2,582, of whom 2,252, or 87.2 per cent, were wage earners, 106, or 4.1 per cent, officials, and 224, or 8.7 per cent, were clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 2,547, or 98.6 per cent, were males and 35, or 1.4 per cent, females.

There were only three wage earners under 16 years of age.

Wage earners employed, by months.—Table 4 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909.

MONTH.	WAGE EARNERS IN THE SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	2,227	95.7
February.....	2,191	94.2
March.....	2,212	95.1
April.....	2,129	91.5
May.....	2,279	97.9
June.....	2,246	96.5
July.....	2,300	98.8
August.....	2,213	95.1
September.....	2,291	98.5
October.....	2,327	100.0
November.....	2,288	98.3
December.....	2,315	99.5

The largest number of wage earners employed during any month of 1909 was 2,327, in October, and the smallest number, 2,129, in April, the minimum number being equal to 91.5 per cent of the maximum. In 1904 the maximum number 2,640, was shown for March, and the minimum number, 2,248, for July, the latter number being equal to 85 per cent of the maximum. The months of maximum and minimum employment for 1909, and the number of wage earners reported for both months, are given for five states in Table 2.

Prevailing hours of labor.—In Table 5 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

PREVAILING HOURS OF LABOR PER WEEK.	WAGE EARNERS IN THE SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY: 1909	
	Average number.	Per cent of total.
Total.....	2,252	100.0
54.....	203	9.0
Between 54 and 60.....	51	2.3
60.....	555	24.6
Between 60 and 72.....	446	19.8
72.....	130	5.8
Over 72.....	867	38.5

Of the 2,252 wage earners in the industry, 867, representing 38.5 per cent of the total, were employed in establishments where the prevailing hours of labor were over 72 per week; 130, or 5.8 per cent, in establishments where the prevailing hours were 72 per week; 1,001, or 44.4 per cent, in establishments where the prevailing hours were 60 but less than 72 per week; and only 254, or 11.3 per cent, in establishments where the prevailing hours were less than 60 per week.

Character of ownership.—All of the 42 establishments in the industry in 1909 were under corporate ownership. In 1904, 31 of the 32 establishments were operated by incorporated companies and one by a firm.

Size of establishments.—In 1909, 19 establishments manufactured products valued at \$100,000 but less than \$1,000,000, and 2, products valued at \$1,000,000 and over; these 21 establishments together reported products valued at \$8,644,108, or 87.5 per cent of the total for the industry. The remaining 21 establishments included 19 with products valued at \$20,000 but less than \$100,000, 1 with products valued at \$5,000 but less than \$20,000, and 1 with products valued at less than \$5,000. In 1904, although there were no establishments having products valued at \$1,000,000 or over, 21 had products valued at \$100,000 but less than \$1,000,000, these establishments reporting a combined product valued at \$8,395,689, or 92.7 per cent of the total for the industry. Of the remaining establishments, 10 reported products valued at \$20,000 but less than \$100,000, and 1 reported products valued at \$5,000 but less than \$20,000.

The average value of products per establishment decreased from \$282,895 in 1904 to \$235,335 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$127,494 to \$107,101. The average number of wage earners per establishment shows a decrease from 76.5 in 1904 to 53.6 in 1909.

Table 6 classifies the establishments in the industry in 1909 according to the number of wage earners employed.

WAGE EARNERS PER ESTABLISHMENT.	SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY: 1909		
	Number of establishments.	Wage earners employed.	
		Average number.	Per cent of total.
1 to 20.....	18	211	9.4
21 to 50.....	10	328	14.6
51 to 100.....	7	540	24.0
101 to 250.....	5	651	28.9
Over 250.....	2	522	23.2

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

Materials.—Table 8 presents statistics of the materials used in establishments manufacturing sulphuric, nitric, and mixed acids as their primary products in 1909, 1904, and 1899.

The quantity of sulphur used in the industry shows an increase of 8.3 per cent for the decade as a whole, all of which took place during the five-year period 1904–1909, while its cost shows a decrease of 12.1 per

of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$8,347,722, distributed as follows: Cost of materials, \$5,385,828, or 64.5 per cent; wages, \$1,494,894, or 17.9 per cent; salaries, \$551,000, or 6.6 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$916,000, or 11 per cent. These proportions, as may be seen by comparing the items in Table 2, vary somewhat in the several states.

Engines and power.—Table 7 shows statistics of power as reported at the censuses of 1900 and 1904.

POWER.	SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY.					
	Number of engines or motors.		Horsepower.		Per cent distribution of horsepower.	
	1909	1904	1909	1904	1909	1904
Primary power, total.....	254	174	6,494	5,416	100.0	100.0
Owned.....	184	142	5,454	5,001	84.0	92.3
Steam.....	176	135	5,083	3,945	78.3	72.8
Gas.....	8	7	371	161	5.7	3.0
Other.....				895		16.5
Rented.....	70	32	1,040	415	16.0	7.7
Electric motors.....	70	32	878	415	13.5	7.7
Other.....			162		2.5	
Electric motors.....	195	45	2,230	540	100.0	100.0
Run by current generated by establishment.....	125	13	1,352	125	60.6	23.1
Run by rented power.....	70	32	878	415	39.4	76.9

The total primary power used in the industry increased from 5,416 horsepower in 1904 to 6,494 horsepower in 1909, or 19.9 per cent. Steam engines furnished the greater part of the power used, 78.3 per cent of the total in 1909 and 72.8 per cent in 1904. Rented electric power ranked second in importance in 1909, constituting 13.5 per cent of the total.

Fuel consumed.—The fuel consumed in the industry in 1909, for all purposes, including that used in the generation of power, comprised 35,943 long tons of anthracite coal, 106,310 short tons of bituminous coal, 124,286 barrels of oil, 104,864,000 cubic feet of gas, 1,298 tons of coke, and 400 cords of wood. Table 2 shows that \$520,084 was expended for fuel and rent of power in 1909.

cent, the average cost per ton in 1909 being considerably less than that in 1904 or 1899. The quantity of pyrites used, on the other hand, increased 87.6 per cent and the cost increased 121.2 per cent during the decade, practically all of these increases taking place between 1904 and 1909. There was a decrease of 7.3 per cent during the decade in the quantity of nitrate of soda used; its cost, however, increased 25.8 per cent.

MATERIAL.	MATERIALS USED IN THE SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY.			
	1909	1904	1899	Per cent of increase: ¹ 1899-1909
Total cost.....	\$5,385,828	\$4,972,838	\$4,033,238	33.5
Sulphur or brimstone:				
Tons.....	26,927	23,044	24,858	8.3
Cost.....	\$403,398	\$479,529	\$459,102	-12.1
Pyrites:				
Tons.....	370,333	197,847	197,459	87.6
Cost.....	\$2,109,932	\$967,207	\$953,680	121.2
Nitrate of soda:				
Tons.....	27,158	27,406	29,301	-7.3
Cost.....	\$1,225,924	\$1,143,280	\$974,429	25.8
All other materials.....	\$1,646,574	\$2,382,822	\$1,646,027	(²)

¹ A minus sign (-) denotes decrease. ² Less than one-tenth of 1 per cent.

Since a very large proportion of the total amount of sulphuric, nitric, and mixed acids manufactured is made by establishments in other industries, either as secondary products or for their own use in further processes of manufacture, the quantity and value of the sulphur, pyrites, and nitrate of soda used by such establishments are shown in Table 9, which also gives the quantity and value of these materials used by establishments in the industry, together with the combined total reported for all establishments making these acids.

MATERIAL.	PRINCIPAL MATERIALS USED IN THE MANUFACTURE OF SULPHURIC, NITRIC, AND MIXED ACIDS: 1909		
	Total.	In establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids.	In establishments engaged primarily in the manufacture of other products. ¹
Number of establishments reporting....	165	42	123
Sulphur or brimstone:			
Quantity (tons).....	42,728	26,927	15,801
Cost.....	\$718,520	\$403,398	\$315,122
Pyrites:			
Quantity (tons).....	990,043	370,333	619,710
Cost.....	\$5,747,007	\$2,109,932	\$3,637,075
Nitrate of soda:			
Quantity (tons).....	46,907	27,158	19,749
Cost.....	\$2,112,251	\$1,225,924	\$886,327

¹ Not including those used by 13 establishments manufacturing explosives and producing for use in further processes of manufacture 42,555 tons of sulphuric acid and 31,484 tons of nitric acid for which separate figures are not available.

In the aggregate, 183 establishments reported the manufacture of sulphuric, nitric, and mixed acids. These establishments include 13 engaged in the manufacture of explosives, for which separate figures as to the materials used in the manufacture of acids are not available, and 5 which reported the utilization of sulphur fumes from the roasting or smelting of copper and zinc sulphide ores. The quantity of ore used by these latter establishments was not fully reported, but was approximately 275,000 tons, and is not included with the pyrites above reported. The sulphur fumes are considered a waste product, and no cost was assigned to them.

The establishments engaged primarily in other industries which manufactured sulphuric, nitric, and

mixed acids include 94 fertilizer factories manufacturing sulphuric acid for their own use, which reported 4,236 tons of sulphur and 456,574 tons of pyrites, or nearly one-half of the aggregate quantity of pyrites reported.

Table 10 shows, by states, the aggregate quantity of sulphur, pyrites, and nitrate of soda used in all establishments manufacturing sulphuric, nitric, and mixed acids, the quantity and cost of such materials used in the industry proper, and the quantity used in establishments engaged chiefly in the manufacture of other products.

MATERIAL AND STATE.	Total quantity (tons).	PRINCIPAL MATERIALS USED IN THE MANUFACTURE OF SULPHURIC, NITRIC, AND MIXED ACIDS: 1909		In establishments engaged primarily in the manufacture of other products (quantity—tons).
		In establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids.		
		Quantity (tons).	Cost.	
Sulphur or brimstone	42,728	26,927	\$403,398	15,801
California.....	3,636	3,636	37,722	.....
Connecticut.....	3,572	3,496	73,615	76
Pennsylvania.....	14,829	13,237	148,742	1,542
All other states.....	20,691	6,508	143,319	14,183
Pyrites	990,043	370,333	2,109,932	619,710
Alabama.....	73,868	.....	.....	73,868
California.....	51,310	43,185	307,163	8,125
Florida.....	17,359	.....	.....	17,359
Georgia.....	121,973	.....	.....	121,973
Maryland.....	75,050	58,558	347,242	16,492
Mississippi.....	20,684	.....	.....	20,684
New Jersey.....	144,867	88,073	448,608	56,794
New York.....	64,812	48,417	304,606	16,395
North Carolina.....	47,715	.....	.....	47,715
Ohio.....	44,206	27,194	152,162	17,012
Pennsylvania.....	32,247	9,116	59,412	23,131
South Carolina.....	80,653	.....	.....	80,653
Tennessee.....	22,902	.....	.....	22,902
Virginia.....	65,682	(¹)	(¹)	(¹)
All other states.....	126,715	58,391	433,165	68,324
Nitrate of soda	46,907	27,158	1,225,924	2,189
California.....	4,597	4,536	178,190	61
Connecticut.....	1,534	1,499	54,344	35
Illinois.....	3,625	(¹)	(¹)	(¹)
Massachusetts.....	4,240	(¹)	(¹)	(¹)
New Jersey.....	11,839	7,661	351,330	4,178
New York.....	5,728	5,006	237,663	722
Ohio.....	1,248	328	14,860	920
Pennsylvania.....	2,020	243	11,864	1,777
All other states.....	12,076	4,653	224,292	7,423

¹ Included in total, but amount omitted to avoid disclosure of individual operations.

² Not including nitrate of soda used as a fertilizer material by establishments in the fertilizer industry.

Products.—Table 11 shows for 1909, 1904, and 1899 the quantity and value of the products reported by establishments manufacturing sulphuric, nitric, and mixed acids as their principal products.

Sulphuric acid is produced in several grades: 50° Baumé acid, also known as chamber acid, containing on an average 51.04 per cent of SO₃; 60° Baumé acid, containing on an average 63.7 per cent of SO₃; and 66° Baumé acid, known as oil of vitriol, containing on an average 76.35 per cent of SO₃. Oleum or fuming sulphuric acid, which consists of SO₃ dissolved in sulphuric acid, usually contains 30 per cent free SO₃, or a total of 87.14 per cent of free and combined SO₃. Oleum is readily produced by the contact process, which was described in the report on chemicals and allied products for 1899, and had then but recently

been introduced into this country; it was first reported at the census of 1904. For the purpose of reducing the different grades to the basis of 50° Baumé acid, the quantity of 60° acid is multiplied by the factor 1.25, that of 66° acid by 1.5, and that of oleum by 1.71.

In 1909, 601,024 tons of pyrite cinder and 43,301 tons of niter cake were reported by all establishments manufacturing sulphuric, nitric, and mixed acids, but a considerable portion of both these residual products had no commercial value at the works.

In addition to the production shown in Table 11, sulphuric, nitric, and mixed acids to the value of \$5,735,370 in 1909 and \$5,195,433 in 1904 were made for sale by establishments engaged primarily in the manufacture of other chemicals and of fertilizers and in other industries. Table 13 gives the aggregate production of these acids for sale both by the establishments in the sulphuric, nitric, and mixed acid industry and by those in other industries during 1909 and 1904.

Table 11

PRODUCTS OF THE SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY.

PRODUCT.	1909	1904	1899	Per cent of increase, ¹ 1899-1909
Total value	\$9,384,057	\$9,052,646	\$8,596,390	15.0
Acids	\$7,567,274	\$6,955,078	\$6,209,872	21.9
Sulphuric:				
Quantity (tons).....	683,588	354,954	324,365	110.7
Reduced to 50° Baumé..	855,191	467,614	452,942	88.8
Value.....	\$5,629,496	\$4,286,312	\$4,071,848	38.3
50° Baumé—				
Quantity (tons).....	315,437	128,389	60,387	422.4
Value.....	\$1,650,406	\$917,683	\$627,882	162.9
60° Baumé—				
Quantity (tons).....	73,073	13,634	13,650	435.3
Value.....	\$401,734	\$121,432	\$199,380	101.5
66° Baumé—				
Quantity (tons).....	267,476	199,663	250,328	6.8
Value.....	\$3,158,097	\$2,886,179	\$3,244,586	-2.7
Oleum or fuming sulphuric acid—				
Quantity (tons).....	27,602	13,268	.....	.....
Value.....	\$419,259	\$361,018	.....	.....
Nitric:				
Quantity (tons).....	4,198	15,153	10,201	-58.8
Value.....	\$499,303	\$1,446,471	\$1,028,266	-51.5
Mixed:				
Quantity (tons).....	22,681	21,406	21,151	7.2
Value.....	\$1,438,475	\$1,222,295	\$1,109,758	29.6
All other products	\$2,316,783	\$2,097,568	\$2,386,518	-2.9

¹ A minus sign (-) denotes decrease.

Of the total value of products in 1909, that of sulphuric acid represented 57 per cent, that of nitric acid 5.1 per cent, and that of mixed acids, 14.6 per cent. The total production of these acids increased 21.9 per cent in value during the decade 1899-1909. The output of sulphuric acid sold as such increased 88.8 per cent on the basis of 50° Baumé acid, and that of mixed acids 7.2 per cent, while the production of nitric acid sold as such shows a decrease of 58.8 per cent, all of which, however, took place between 1904 and 1909.

The value of "all other products" includes the value of pyrite cinder and niter cake sold. Table 12 gives the statistics for these waste products for 1909.

Table 13

SULPHURIC, NITRIC, AND MIXED ACIDS MADE FOR SALE.

	Total.	Made in establishments engaged primarily in the manufacture of—		Per cent of total contributed by establishments engaged primarily in the manufacture of—	
		Sulphuric, nitric, and mixed acids.	Other products.	Sulphuric, nitric, and mixed acids.	Other products.
Number of establishments reporting:					
1909.....	110	42	68	38.2	61.8
1904.....	32	(¹)	.....	.....	.....
Sulphuric, nitric, and mixed acids, total value:					
1909.....	\$13,302,644	\$7,567,274	\$5,735,370	56.9	43.1
1904.....	12,150,511	6,955,078	5,195,433	57.2	42.8
Sulphuric—					
Quantity (tons), reduced to 50° Baumé—					
1909.....	1,476,992	855,191	621,801	57.9	42.1
1904.....	900,991	467,614	433,377	51.9	48.1
Value—					
1909.....	\$10,084,759	\$5,629,496	\$4,455,263	55.8	44.2
1904.....	7,942,211	4,286,312	3,655,899	54.0	46.0
Nitric—					
Quantity (tons)—					
1909.....	13,663	4,198	9,465	30.7	69.3
1904.....	23,132	15,153	7,979	65.5	34.5
Value—					
1909.....	\$1,357,098	\$499,303	\$857,795	36.8	63.2
1904.....	2,250,944	1,446,471	804,473	64.3	35.7
Mixed—					
Quantity (tons)—					
1909.....	28,591	22,681	5,910	79.3	20.7
1904.....	32,665	21,406	11,259	65.6	34.5
Value—					
1909.....	\$1,860,787	\$1,438,475	\$422,312	77.3	22.7
1904.....	1,957,356	1,222,295	735,061	62.4	37.6

¹ Figures not available.

Of the total value of sulphuric, nitric, and mixed acids reported as made for sale in 1909 by establishments engaged primarily in the manufacture of other products (\$5,735,370), establishments engaged in the manufacture of other chemicals contributed \$3,989,025, those included in the fertilizer industry, \$923,492, and zinc smelting and refining establishments, \$487,507, the balance being reported by establishments engaged in the manufacture of explosives, mucilage and paste, and paints, in petroleum refining, and in copper smelting.

It will be noted that of the total value of sulphuric, nitric, and mixed acids produced for sale in 1909, less than three-fifths (56.9 per cent) was reported by establishments manufacturing these acids as primary

Table 12

PYRITE CINDER AND NITER CAKE REPORTED BY ESTABLISHMENTS MANUFACTURING SULPHURIC, NITRIC, AND MIXED ACIDS.

PRODUCT.	Total.	By establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids.	
		By establishments engaged primarily in the manufacture of sulphuric, nitric, and mixed acids.	By establishments engaged primarily in the manufacture of other products.
Pyrite cinder:			
Total quantity (tons).....	601,024	155,738	445,286
Reported with value.....	404,318	71,688	332,630
Reported with no value.....	196,706	84,050	112,656
Value of quantity "reported with value".....	\$325,632	\$127,270	\$198,362
Niter cake:			
Total quantity (tons).....	43,301	20,489	22,812
Reported with value.....	27,546	14,061	13,485
Reported with no value.....	15,755	6,428	9,327
Value of quantity "reported with value".....	\$53,693	\$32,651	\$21,042

products, the proportion in 1904 being about the same. The percentages of the total production reported by such establishments in 1909 vary considerably in the case of the different acids, ranging from 79.3 for mixed acids to 30.7 for nitric acid.

In addition to the sulphuric acid made for sale, large quantities are made for use in further processes of manufacture by establishments engaged primarily in the manufacture of other chemicals, fertilizers, and explosives, and in the refining of petroleum. Table 14 presents statistics as to the total production of sulphuric acid, by grades, in 1909, 1904, and 1899, including that consumed in the establishment where produced.

	SULPHURIC ACID PRODUCED (INCLUDING THAT CONSUMED IN THE ESTABLISHMENT WHERE PRODUCED).					
	1909	1904	1899	Per cent of increase. ¹		
				1899-1909	1904-1909	1899-1904
Total production:						
Quantity (tons), as reported.....	2,400,505	1,642,262	1,352,730	77.5	46.2	21.4
Value.....	\$16,779,195	\$15,174,886	\$14,247,185	17.8	10.6	6.5
Reduced to 50° Baumé acid (tons):						
For sale.....	2,748,527	1,869,437	1,548,123	77.5	47.0	20.8
For use in establishment where produced.....	1,476,992	900,992	783,768	88.4	63.9	15.0
50° Baumé—						
Quantity (tons).....	1,271,535	968,445	764,355	66.4	31.3	26.7
Value.....	\$8,494,451	\$8,314,646	\$7,965,832	70.3	38.9	22.6
60° Baumé—						
Quantity (tons).....	186,900	48,688	17,012	998.6	283.9	186.2
Value.....	\$1,089,350	\$581,523	\$246,284	342.3	87.3	136.1
66° Baumé—						
Quantity (tons).....	558,078	411,165	382,279	46.0	35.7	7.6
Value.....	\$6,719,259	\$5,917,099	\$6,035,069	11.3	13.5	-1.9
Oleum or fuming sulphuric acid—						
Quantity (tons).....	31,349	13,268	.....	.....	136.3	.....
Value.....	\$476,135	\$361,018	.....	.....	31.9	.....

¹ A minus sign (—) denotes decrease.

Approximately one-half of the total amount of sulphuric acid made is used in the establishments manufacturing it, the proportion of the total quantity on the basis of 50° acid being 46.3 per cent in 1909, 51.8 per cent in 1904, and 49.4 per cent in 1899. The bulk of the acid used in the establishment where produced is 50° Baumé, or chamber acid. The chamber process is in most general use. The use of the contact process

was reported by 17 establishments. The weight of the platinum used in the contact mass was not in all cases reported, but the quantities reported ranged from a minimum of 257 ounces to a maximum of 1,587 ounces. It is not possible to give the quantity of acid made by the contact and by the chamber processes, respectively, as the production by each process was not separately reported in the case of establishments using both.

Table 15 gives the total production of nitric acid reported by all establishments in 1909, 1904, and 1899, and shows the quantity and value of that made for sale and the quantity consumed in the establishments where produced.

	NITRIC ACID PRODUCED (INCLUDING THAT CONSUMED IN THE ESTABLISHMENT WHERE PRODUCED).					
	1909	1904	1899	Per cent of increase. ¹		
				1899-1909	1904-1909	1899-1904
Total production (tons).....	68,717	54,190	31,542	118.0	28.8	71.8
For sale:						
Quantity (tons).....	13,663	23,132	15,481	-11.7	-40.9	49.4
Value.....	\$1,357,098	\$2,250,944	\$1,454,909	-6.7	-39.7	54.7
For use in establishment where produced (tons).....	55,054	31,058	16,061	242.8	77.3	93.4

¹ A minus sign (—) denotes decrease.

The total production of nitric acid in 1909 was 68,717 tons, as compared with 54,190 tons in 1904, and 31,542 tons in 1899, the increase for the decade being 118 per cent. In 1899 but slightly more than half of the total production (50.9 per cent) was used in the establishments where produced, while in 1909 the proportion was over four-fifths (80.1 per cent).

Mixtures of sulphuric acid and nitric acid are now used to a considerable extent in the manufacture of explosives and other chemicals. The statistics of production were first reported in 1899. The total production for sale was 28,591 tons, valued at \$1,860,787, in 1909; 32,665 tons, valued at \$1,957,356, in 1904; and 21,184 tons, valued at \$1,111,158, in 1899, showing an increase for the decade of 35 per cent in quantity and of 67.4 per cent in value.

Table 16 shows, by states, the detailed statistics of the manufacture of sulphuric, nitric, and mixed acids the products of establishments engaged primarily in in 1909.

Table 16 PRODUCT.	PRODUCTS OF THE SULPHURIC, NITRIC, AND MIXED ACID INDUSTRY.								
	United States.	California.	Conne- cticut.	Maryland.	New Jersey.	New York.	Ohio.	Pennsyl- vania.	All other states.
Total value.....	\$9,884,057	\$1,160,937	\$497,688	\$687,654	\$2,127,637	\$1,393,594	\$417,702	\$624,473	\$2,374,372
Sulphuric, nitric, and mixed acids.....	\$7,567,274	\$1,150,033	\$341,612	\$687,426	\$1,782,767	\$1,110,876	\$321,358	\$494,611	\$1,678,591
Sulphuric:									
Quantity (tons), reduced to 50°									
Baumé.....	855,191	82,498	26,892	132,760	188,198	90,447	55,553	58,493	220,350
Value.....	\$5,629,496	\$782,106	\$268,580	\$687,426	\$1,228,661	\$693,615	\$314,405	\$494,611	\$1,160,092
50° Baumé—									
Quantity (tons).....	¹ 362,636	¹ 49,152	10,091	132,760	42,689	¹ 20,930	32,600	.....	74,414
Value.....	\$2,069,665	\$413,845	\$109,606	\$687,426	\$200,045	\$119,046	\$142,287	.....	\$397,410
60° Baumé—									
Quantity (tons).....	73,073	541	.....	.....	.....	8,346	.....	.....	64,186
Value.....	\$401,734	\$8,267	.....	.....	.....	\$74,086	.....	.....	\$319,381
66° Baumé—									
Quantity (tons).....	267,476	21,780	11,201	.....	97,006	39,390	15,302	38,995	43,802
Value.....	\$3,158,097	\$359,994	\$158,974	.....	\$1,028,616	\$500,483	\$172,118	\$494,611	\$443,301
Nitric:									
Quantity (tons).....	4,198	295	847	.....	1,866	227	.....	.....	963
Value.....	\$499,303	\$38,881	\$73,032	.....	\$247,729	\$26,561	.....	.....	\$113,100
Mixed:									
Quantity (tons).....	22,681	7,056	.....	.....	3,950	6,144	87	.....	5,444
Value.....	\$1,438,475	\$329,046	.....	.....	\$306,377	\$390,700	\$6,953	.....	\$405,399
All other products.....	\$2,316,783	\$10,904	\$156,076	\$228	\$344,870	\$282,718	\$96,344	\$129,862	\$1,295,781

¹ Includes oleum reduced to 50° Baumé.

WOOD DISTILLATION

WOOD DISTILLATION.

Scope of the industry.—The establishments making up the industry designated "wood distillation, not including turpentine and rosin" comprise those engaged primarily in the distillation of wood by either the destructive or steam process. The principal products of this industry are wood alcohol, acetate of lime, turpentine, tar, and charcoal; and among the less important products are acetone, formaldehyde, wood ashes, pyroligneous acid, pyrolignite of iron, and wood creosote.

In the North the hardwoods are generally used, the principal products being wood alcohol, acetate of lime, and charcoal. In the South wood distillation is usually confined to pine, and the main products are turpentine, tar, and charcoal. Plants whose principal product is charcoal are not included in this industry, nor establishments making spirits of turpentine from the crude turpentine or gum exuded by the southern pine, these establishments constituting, respectively, the charcoal industry and the turpentine and rosin industry as defined by the Census Bureau.

The statistics cover several establishments which purchase crude wood alcohol as their raw material and by further processes of manufacture turn it into the refined product. This results in a certain amount of duplication in the returns, 7,135,614 gallons of crude alcohol, valued at \$1,784,029, having been purchased in 1909 by these refining establishments. It is fair to assume that most of this alcohol was produced by other establishments in the industry and was included among the products reported by them.

Comparison with earlier censuses.—The returns for 1899 were made in such a way that separate totals for the industry can be presented for that census, but the returns for prior censuses can not now be segregated. Table 1 summarizes the statistics of the industry for 1909, 1904, and 1899.

The value of products reported for 1909 exceeded

that for 1899 by \$3,735,975, a relative increase for the decade of 62.3 per cent. The number of wage earners increased from 1,556 in 1899 to 2,721 in 1909, a gain of 74.9 per cent, while the amount paid in wages more than doubled during the decade. The decrease from 1904 to 1909 in the number of proprietors and firm members reported is explained by the decrease in the number of establishments under individual and firm ownership. The cost of materials in 1909 was \$5,875,851, which was equal to 60.3 per cent of the value of products, and the value added by manufacture (value of products less cost of materials) was \$3,861,147.

Table 1

	NUMBER OR AMOUNT.			PER CENT OF INCREASE. ¹		
	1909	1904	1899	1899-1909	1904-1909	1899-1904
Number of establishments..	120	141	102	17.6	-14.9	38.2
Persons engaged in the industry.....	3,095	2,655	(²)	.....	16.6	.....
Proprietors and firm members.....	56	32	(²)	.....	-31.7	.....
Salaried employees.....	318	301	235	35.3	5.6	28.1
Wage earners (average number).....	2,721	2,272	1,556	74.9	19.8	46.0
Primary horsepower.....	9,854	4,620	(²)	.....	113.3	.....
Capital.....	\$13,017,192	\$10,506,979	\$6,729,127	93.4	23.9	56.1
Expenses.....	8,473,558	6,843,521	4,736,829	78.9	23.8	44.5
Services.....	1,818,059	1,364,314	913,509	99.0	33.3	49.3
Salaries.....	355,211	297,528	213,025	66.7	19.4	39.7
Wages.....	1,462,848	1,066,786	700,484	108.8	37.1	52.3
Materials.....	5,875,851	4,847,770	3,455,015	70.1	21.2	40.3
Miscellaneous.....	779,648	631,437	368,305	111.7	23.5	71.4
Value of products.....	9,736,998	7,813,483	6,001,023	62.3	24.6	30.2
Value added by manufacture (value of products less cost of materials).....	3,861,147	2,965,713	2,546,008	51.7	30.2	16.5

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

Summary, by states.—Table 2 summarizes the more important statistics for the industry, by states, the states being arranged according to the value of products for 1909. The ranking of the states in this table is their actual ranking among all the states in the industry, although the statistics for some states are omitted in order to avoid disclosing individual operations.

Table 2

STATE.	Number of establishments: 1909	WAGE EARNERS.				VALUE OF PRODUCTS.				VALUE ADDED BY MANUFACTURE.				PER CENT OF INCREASE. ¹		
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number): 1904-1909	Value of products: 1904-1909	Value added by manufacture: 1904-1909
				1909	1904			1909	1904			1909	1904			
United States.....	120	2,721	100.0	.....	.....	\$9,736,998	100.0	.....	.....	\$3,861,147	100.0	.....	.....	19.8	24.6	30.2
New York.....	29	593	21.8	3	2	3,401,722	34.9	1	1	883,201	22.8	3	2	21.3	1.3	0.7
Pennsylvania.....	50	933	34.3	1	1	2,960,162	30.4	2	2	1,276,213	33.1	1	1	-25.3	-4.3	-7.8
Michigan.....	12	806	29.6	2	3	2,398,927	24.6	3	3	1,243,578	32.2	2	3	177.0	224.9	221.0
Georgia.....	4	63	2.3	5	4	209,214	2.1	4	6	95,401	2.5	4	7	.....	.....	.....
Florida.....	7	82	3.0	4	6	138,146	1.4	6	5	83,371	2.2	5	5	.....	.....	.....
North Carolina.....	5	51	1.9	6	5	104,241	1.1	7	7	70,334	1.8	6	6	.....	.....	.....
South Carolina.....	3	19	0.7	11	7	51,878	0.5	11	14	33,903	0.9	9	13	.....	.....	.....
All other states.....	10	174	6.4	.....	.....	472,708	4.9	.....	.....	175,146	4.5	.....	.....	.....	.....	.....

¹ A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture.

Three states, New York, Pennsylvania, and Michigan, together reported 85.7 per cent of the average number of wage earners in 1909, 90 per cent of the value of products, and 88.1 per cent of the value added by manufacture. Outside of the 3 leading states only 29 establishments were reported, these being distributed among 12 states—Alabama, Georgia, Florida, Louisiana, Missouri, New Jersey, North Carolina, Oregon, South Carolina, Vermont, West Virginia, and Wisconsin. Figures for 1899 for the individual states are not available.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	3,095	3,064	31
Proprietors and officials.....	255	249	6
Proprietors and firm members.....	56	50	6
Salaried officers of corporations.....	73	73	
Superintendents and managers.....	126	126	
Clerks.....	119	94	25
Wage earners (average number).....	2,721	2,721	
16 years of age and over.....	2,721	2,721	
Under 16 years of age.....			

Of the 3,095 persons engaged in the industry during 1909, 2,721, or 87.9 per cent, were wage earners, 255, or 8.2 per cent, proprietors and officials, and 119, or 3.8 per cent, clerks, this class including other subordinate salaried employees. Of the persons engaged in the industry, 99 per cent were males. No females or children were reported among the wage earners.

Wage earners employed, by months.—Table 4 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during 1909. The number of wage earners for the months of maximum and minimum employment are shown for seven states in Table 14.

MONTH.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909	
	Number.	Per cent of maximum.
January.....	2,800	91.7
February.....	2,868	93.9
March.....	2,807	91.9
April.....	2,754	90.2
May.....	2,626	86.0
June.....	2,563	84.0
July.....	2,519	82.5
August.....	2,478	81.2
September.....	2,604	85.3
October.....	2,707	88.7
November.....	2,869	94.0
December.....	3,053	100.0

In the industry as a whole the largest number of wage earners employed during any month of 1909 was 3,053, in December, and the smallest number, 2,478, in August, the minimum number being equal to 81.2 per cent of the maximum. In 1904 the maximum number, 2,399, was reported for January, and the minimum number, 2,052, for July, the latter number being equal to 85.5 per cent of the former.

Prevailing hours of labor.—In Table 5 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

PREVAILING HOURS OF LABOR.	WAGE EARNERS IN THE INDUSTRY: 1909	
	Average number.	Per cent of total.
Total.....	2,721	100.0
48 and under.....	51	1.9
54.....	42	1.5
Between 54 and 60.....	6	0.2
60.....	1,023	37.6
Between 60 and 72.....	658	24.2
72.....	242	8.9
Over 72.....	699	25.7

Of the 2,721 wage earners employed in the industry, 37.6 per cent were in establishments where the prevailing hours were 60 per week, 24.2 per cent where the prevailing hours were between 60 and 72, and 34.6 per cent where they were 72 or over. Only 3.6 per cent of the wage earners worked in establishments where the prevailing hours were less than 60 per week.

Character of ownership.—Table 6 presents statistics with respect to the character of ownership of the establishments in the industry.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	120	141	\$9,736,998	\$7,813,483
Individual.....	14	15	648,479	378,402
Firm.....	14	26	673,533	897,168
Corporation.....	92	100	8,414,986	6,537,913
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	11.7	10.6	6.7	4.8
Firm.....	11.7	18.4	6.9	11.5
Corporation.....	76.7	70.9	86.4	83.7

In 1909, of the total number of establishments, 76.7 per cent were under corporate ownership, as compared with 70.9 per cent in 1904. In 1909 the value of products of these establishments represented 86.4 per cent of the total, and in 1904, 83.7 per cent.

Size of establishments.—Table 7 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	120	141	\$9,738,898	\$7,813,483
Less than \$5,000.....	8	12	22,670	(¹)
\$5,000 and less than \$20,000.....	30	41	392,267	(¹)
\$20,000 and less than \$100,000.....	61	76	3,111,998	3,221,869
\$100,000 and over.....	21	12	6,210,063	* 2,115,792
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	6.7	8.5	0.2	(¹)
\$5,000 and less than \$20,000.....	25.0	29.1	4.0	(¹)
\$20,000 and less than \$100,000.....	50.8	53.9	32.0	41.2
\$100,000 and over.....	17.5	8.5	63.8	* 27.1

¹ Figures can not be shown without disclosing individual operations.

* Excluding figures for one establishment with products valued at over \$1,000,000, to avoid disclosure of individual operation.

In 1909, 17.5 per cent of the establishments manufactured products valued at \$100,000 or over, and the value of their products represented 63.8 per cent of the total. Comparative figures for 1904 for establishments of this class can not be given without disclosing individual operations.

The average value of products per establishment increased from \$55,415 in 1904 to \$81,142 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$21,033 to \$32,176. The average number of wage earners per establishment, likewise, shows an increase from 16 in 1904 to 23 in 1909.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total reported expenses in 1909 to have been \$8,473,558, distributed as follows: Cost of materials, \$5,875,851, or 69.3 per cent; wages, \$1,462,848, or 17.3 per cent; salaries, \$355,211, or 4.2 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$779,648, or 9.2 per cent.

Engines and power.—Table 8 shows statistics of power used in the industry as reported at the censuses of 1909 and 1904.

The total primary power used in the industry increased from 4,620 horsepower in 1904 to 9,854 horsepower in 1909, or 113.3 per cent. Steam power is by far the most important form of power used in this industry, constituting 91.9 per cent of the total primary power in 1909 and 81 per cent in 1904. Water power and the power of gas engines, on the other hand, each formed a smaller proportion of the total in 1909 than in 1904. Rented electric power was but little used in the industry, even in 1909, but the horse power of electric motors used for distributing power by means of current generated in the same establishment increased from 14 in 1904 to 505 in 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.		HORSEPOWER.		PER CENT DISTRIBUTION OF HORSEPOWER.	
	1909	1904	1909	1904	1909	1904
Primary power, total	226	205	9,854	4,620	100.0	100.0
Owned	224	203	9,779	4,588	99.2	99.3
Steam.....	170	154	9,056	3,744	91.9	81.0
Gas.....	25	13	462	287	4.7	6.2
Water wheels.....	29	35	261	370	2.6	8.0
Water motors.....	1	1	2	2	(¹)	(¹)
Other.....			185			4.0
Rented	2	2	75	32	0.8	0.7
Electric.....	2	2	75	12	0.8	0.3
Other.....			20			0.4
Electric motors	39	4	580	28	100.0	100.0
Run by current generated by establishment.....	37	2	505	14	87.1	53.8
Run by rented power.....	2	2	75	12	12.9	46.2

¹ Less than one-tenth of 1 per cent.

Fuel consumed.—Table 9 shows the quantity of the different kinds of fuel used in the industry in 1909.

KIND OF FUEL.	Unit.	Quantity.
Anthracite coal.....	Long tons.....	48,518
Bituminous coal.....	Short tons.....	225,471
Coke.....	Short tons.....	35
Wood.....	Cords.....	859,064
Oil, including gasoline.....	Barrels.....	8
Gas.....	1,000 feet.....	2,288,372

No distinction is made between wood consumed as fuel and that subjected to distillation. At the census of 1909, 859,064 cords of wood were reported as used in the industry during the year, but in some cases the quantity of wood consumed as material in the processes of wood distillation was not reported. In connection with the annual investigation in regard to the forest products of the United States for 1909,¹ the consumption of 1,265,157 cords of wood in the processes of wood distillation was reported. This amount includes 1,149,847 cords of hardwood, the leading states reporting hardwood being Michigan, Pennsylvania, and New York, and 115,310 cords of softwood, used chiefly in Alabama, Florida, and Georgia. In partial explanation of the difference between the figures in the two reports, it should be noted that the statistics covering the consumption of wood as shown in the forest products report in some instances include wood used in charcoal burning, which is not included in the statistics for the wood distillation industry.

In addition to the fuel shown in Table 9, considerable quantities of the products—charcoal, tar, and wood oil—for which there was not a ready market, were also used as fuel.

The amount reported as expended for fuel and rent of power in 1909, including the cost of wood consumed as a material, is shown by states in Table 14. The total amount was \$3,109,377, which represents 52.9 per cent of the cost of all materials.

¹ Forest Products of the United States, 1909, p. 163.

Products.—At the census of 1879 there was reported a production of crude wood alcohol, valued at \$86,274, and 6,593,009 pounds of acetate of lime, valued at \$156,892. At the census of 1889 a production of 1,116,075 gallons of crude wood alcohol, valued at \$688,764, and 26,778,415 pounds of acetate of lime, valued at \$315,430, was reported. At the census of 1899 the production of crude wood alcohol was reported as 4,945,963 gallons, valued at \$1,976,986, and that of acetate of lime as 86,826,000 pounds, valued at \$981,286.

Table 10 shows the quantity and value of the chief products of the wood distillation industry for 1909 and 1904.

PRODUCTS.	WOOD DISTILLATION PRODUCTS.			
	Made by establishments in the wood distillation industry.		Made by establishments engaged primarily in the manufacture of other products.	
	1909	1904	1909	1904
Total value	\$9,736,998	\$7,813,483		
Wood alcohol.....				
Crude—				
Gallons.....	\$4,529,587	\$4,775,699	\$341,680	\$881,887
Value.....	6,359,848	6,684,871	412,852	129,387
Refined—	\$1,627,878	\$2,161,813	\$146,561	\$40,148
Gallons.....	6,276,071	4,316,346	456,806	1,600,807
Value.....	\$2,901,709	\$2,613,886	\$195,099	\$841,739
Acetate of lime:				
Pounds.....	132,141,442	105,141,361	9,336,854	5,242,636
Value.....	\$1,981,220	\$1,474,952	\$137,223	\$52,751
Charcoal:				
Bushels.....	39,017,247	23,872,055	934,988	6,045,157
Value.....	\$2,351,644	\$1,197,973	\$75,004	\$289,192
Turpentine:				
Gallons.....	706,868	442,185	18,310	
Value.....	\$249,526	\$176,521	\$7,482	
All other wood distillation products.....	\$357,290	\$138,481		
All other products.....	\$267,731	\$49,827		

The total production of crude alcohol, including that reported by establishments not engaged primarily in wood distillation and that which was made and used in the manufacture of refined alcohol, was 9,307,583 gallons, in 1909, as compared with 8,282,286 gallons in 1904, an increase of 1,025,297 gallons, or 12.4 per cent. The total production of refined wood alcohol, including that reported as a subsidiary product by establishments engaged primarily in the manufacture of other products, was 6,732,877 gallons, valued at \$3,096,808, in 1909, as compared with 5,917,153 gallons, valued at \$3,455,625, in 1904, an increase of 13.8 per cent in quantity, but a decrease of 10.4 per cent in value.

From 1904 to 1909 the percentages of increase for several other specified products were as follows: Acetate of lime, 28.2 per cent in quantity and 38.7 per cent in value; charcoal, 33.5 per cent in quantity and 63.2 per cent in value; and turpentine, 64 per cent in quantity and 45.6 per cent in value.

In the group designated "all other wood distillation products" are included tar, acetone, formaldehyde, wood ashes, pyroligneous acid, pyrolignite of iron, wood creosote, and other unspecified products.

Table 11 shows for 1909 the products of the industry as given in the report on Forest Products of the United States.

PRODUCT.	VALUE OF PRODUCTS: 1909
Total value	\$8,328,484
Wood alcohol, crude:	
Gallons.....	8,468,083
Value.....	\$2,082,258
Acetate of lime:	
Pounds.....	150,926,386
Value.....	\$2,225,050
Charcoal:	
Bushels.....	55,478,503
Value.....	\$3,509,019
Turpentine:	
Gallons.....	682,702
Value.....	\$243,491
All other wood distillation products.....	\$205,830
All other products.....	\$62,841

The statistics shown in Table 11, taken from the report on Forest Products of the United States, differ somewhat from those given in Table 10 of this report. The primary object of that portion of the inquiry relative to forest products which relates to wood distillation was to ascertain the quantity of hardwoods and of softwoods consumed in these processes, and the statistics cover only the establishments which use wood as their raw material, whereas the census inquiry upon which the present report is mainly based covered both the establishments that made the crude alcohol from wood and those which were engaged wholly in refining crude alcohol. The statistics in Table 10, for instance, show the final output of the establishments during the year, both of crude alcohol and of refined alcohol, while the statistics in the report on forest products cover the production of crude alcohol only. The final product of most of the establishments included in the census reports is crude wood alcohol, which is disposed of to other establishments engaged solely in the refining process. In addition, the charcoal product shown in the report on forest products includes that reported by some charcoal burners, who are not included in the wood distillation industry as defined by the Bureau of the Census.

Table 12 shows, by states, the quantity and value of each of the principal products manufactured in the wood distillation industry in 1909.

PRODUCT AND STATE.	PRODUCTS: 1909	
	Quantity.	Value.
Wood alcohol, refined, gallons	6,276,071	\$2,901,709
Michigan.....	1,661,589	684,743
New York.....	4,129,345	2,058,844
All other states.....	485,137	158,122
Wood alcohol, crude, gallons	6,359,848	1,627,878
New York.....	2,370,713	676,443
Pennsylvania.....	3,376,374	797,010
All other states.....	612,761	154,425
Acetate of lime, pounds	132,141,442	1,981,220
Michigan.....	32,907,258	467,476
New York.....	24,511,279	372,045
Pennsylvania.....	69,488,589	1,069,884
All other states.....	5,234,316	71,815
Charcoal, bushels	39,017,247	2,351,644
Michigan.....	13,514,106	868,003
New York.....	5,147,160	287,103
Pennsylvania.....	16,357,598	936,357
All other states.....	3,998,383	260,181
Turpentine, gallons	706,868	249,526
Florida.....	174,206	63,864
Georgia.....	262,000	88,451
North Carolina.....	64,900	26,719
South Carolina.....	68,513	23,328
All other states.....	137,249	47,164

Distillation equipment.—Table 13 shows, by states, the equipment of the wood distillation plants in retorts, ovens, and kilns in 1909.

The aggregate capacity per charge was 24,594 cords, of which that of kilns constituted 84.7 per cent, that

of retorts 11 per cent, and that of ovens 4.4 per cent. Kilns are used chiefly in Michigan and Missouri; ovens in Pennsylvania and New York, with a few in Michigan, Georgia, and North Carolina; and retorts in all the states reporting, with the exception of Missouri.

EQUIPMENT.	United States.	Michi-gan.	New York.	Penn-syl-vania.	All other states.	EQUIPMENT.	United States.	Michi-gan.	New York.	Penn-syl-vania.	All other states.
Retorts:						Ovens:					
Total number.....	1,448	101	496	607	244	Total number.....	177	10	29	123	15
Total capacity, cords.....	2,703	675	427	958	643	Total capacity, cords.....	1,080	90	167	791	32
Less than 2 cords per charge—						Less than 5 cords per charge—					
Number.....	1,122		474	508	140	Number.....	34		12	10	12
Capacity.....	990		365	508	117	Capacity.....	84		42	40	2
2, but less than 5 cords—						5 cords and over—					
Number.....	148	31	22	59	36	Number.....	143	10	17	113	3
Capacity.....	388	99	62	118	109	Capacity.....	996	90	125	751	30
5 cords and over—						Kilns:					
Number.....	178	70		40	68	Number.....	310	230	2	6	72
Capacity.....	1,325	576		332	417	Capacity, cords.....	20,811	16,600	18	89	4,104

Detailed state table.—The principal data secured by the census inquiry concerning the industry are presented, by states, in Table 14, which gives detailed statistics for 1909 concerning the number of persons

engaged in the industry, primary horsepower, wage earners on December 15, or the nearest representative day, capital, expenses, value of products, and the value added by manufacture.

WOOD DISTILLATION—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.		
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.			
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.	
								Maximum month.	Minimum month.							
United States.....	120	3,095	56	199	94	25	2,721	De	3,053	Au	2,478	3,114	3,114			8,854
Florida.....	7	102	2	11	7		82	De	137	My ¹	48	137	137			738
Georgia.....	4	77	2	5	7		63	Ja ¹	66	Jy	36	66	66			570
Michigan.....	12	859	1	28	21	3	806	De	955	Jy	737	946	946			5,012
New York.....	29	668	10	40	17	8	593	Fe	651	Au	501	646	646			599
North Carolina.....	5	67		10	5	1	51	De	58	Je ¹	44	57	57			75
Pennsylvania.....	50	1,093	36	85	28	11	933	Ja	1,058	Au	837	1,052	1,052			1,749
South Carolina.....	3	28		5	3	1	19	De	35	Au	10	35	35			675
All other states ²	10	201	5	15	6	1	174					175	175			436

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.			Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.			
United States.....	\$13,017,182	\$8,473,558	\$280,317	\$74,884	\$1,462,848	\$3,108,377	\$2,766,474	\$2,765	\$66,677	\$16,636	\$684,670	\$9,736,988	\$3,881,147	
Florida.....	263,925	132,372	9,732	1,780	32,402	10,268	44,507		1,312		32,371	138,146	83,371	
Georgia.....	356,392	179,585	13,425	4,150	34,874	643	113,170		1,204		12,119	209,214	95,401	
Michigan.....	2,829,750	1,956,220	39,918	23,848	504,151	969,106	186,243		23,226	12,336	197,392	2,398,927	1,243,578	
New York.....	3,298,055	3,143,341	65,340	14,162	262,095	604,464	1,914,057	75	14,362		268,786	3,401,722	883,201	
North Carolina.....	204,837	87,553	14,140	4,710	15,598	7,256	28,651		513		18,685	104,241	70,334	
Pennsylvania.....	5,111,070	2,490,091	112,517	20,515	521,643	1,463,326	220,623	790	22,948	2,200	125,529	2,960,162	1,276,213	
South Carolina.....	70,436	41,246	4,700	2,700	8,692	4,325	13,650		140	1,000	6,039	51,878	33,903	
All other states ²	882,727	443,150	20,545	3,029	83,393	49,989	247,573	1,900	2,972		33,749	472,708	175,146	

¹ Same number reported for one or more other months.

² All other states embrace: Alabama, 2 establishments; Louisiana, 2; Missouri, 1; New Jersey, 1; Oregon, 1; Vermont, 1; West Virginia, 1; Wisconsin, 1.

COKE

THE COKE INDUSTRY.

GENERAL STATISTICS.

Summary and comparison with earlier censuses.—The statistics presented in this report are for establishments engaged in the manufacture of "oven coke." They do not cover those making ordinary gas-house coke, which is obtained as a by-product in the manufacture of illuminating gas. Although oven coke was manufactured in the United States for some years

prior to 1849, the census of that year was the first at which statistics for the industry were shown, but the census of 1879 was the first to include statistics for the industry that are comparable with those for more recent censuses. Table 1 summarizes the statistics of the industry for each census from 1879 to 1909, inclusive.

Table 1	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	315	278	241	218	126	30.7	13.3	15.4	10.6	73.0
Persons engaged in the industry.....	31,226	20,440	17,962	(²)	(²)	73.8	52.8	13.8		
Proprietors and firm members.....	101	73	48	(²)	(²)		38.4			
Salaried employees.....	1,852	1,386	915	(²)	(²)	102.4	35.6	51.5		
Wage earners (average number).....	29,273	18,981	16,999		3,140	72.2	54.2	11.7		(³)
Primary horsepower.....	52,502	66,669	34,767			80.1	-6.1	91.8	582.4	
Capital.....	\$152,321,337	\$90,712,877	\$36,502,679	\$17,462,729	\$4,769,858	317.3	67.9	148.5	109.0	266.1
Expenses.....	\$84,839,245	\$45,327,662	\$23,733,532	\$16,090,785		185.3	87.2	52.4	84.8	
Services.....	\$17,526,496	\$10,552,000	\$7,883,032	\$4,186,264	\$1,197,744	122.3	66.1	33.9	88.3	249.5
Salaries.....	\$2,072,150	\$1,247,502	\$797,295	(²)	(²)	159.9	66.1	55.5		
Wages.....	\$15,454,345	\$9,304,498	\$7,085,736	(²)	(²)	118.1	66.1	31.3		
Materials.....	\$64,024,527	\$29,884,532	\$19,665,532	\$11,509,737	\$2,995,441	225.6	114.2	62.0	70.9	284.2
Miscellaneous.....	\$3,288,223	\$4,891,130	\$2,184,968	\$394,784		50.5	-32.5	123.9	453.5	
Value of products.....	\$95,696,622	\$51,728,647	\$35,585,445	\$16,498,345	\$5,359,489	168.9	85.0	45.4	115.7	207.8
Value added by manufacture (value of products less cost of materials).....	\$31,672,095	\$21,844,115	\$15,919,913	\$4,988,608	\$2,364,048	98.9	45.0	37.2	219.1	111.0
Coke produced, short tons ⁴	39,315,065	25,143,288	19,640,798	10,008,169	2,752,475	100.2	56.4	28.0	96.2	263.6

¹ A minus sign (-) denotes decrease. Where percentages are omitted comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

⁴ Includes 415,472 tons of coke in 1909 and 410,225 tons in 1904 produced by establishments engaged primarily in the manufacture of products other than coke, the value of which is not included in the value of products shown in this table.

Most of the coke ovens are operated in connection with coal mines, but the statistics given in this report relate only to the manufacture of coke. If separate accounts were not kept for the two branches of industry, as was the case in a few instances, estimates were secured for the items pertaining to the production of coke, including an estimate of the quantity and value of the coal used.

Coke is made in beehive ovens and in by-product ovens or retorts. Where beehive ovens are used the cost of materials—chiefly bituminous coal—constitutes a rather large proportion of the total value of products, the process of manufacture itself being relatively simple and inexpensive, but the processes in the manufacture of coke in by-product ovens or retorts are complex, and the apparatus and operation costly. The total cost of the materials used in the manufacture of coke in 1909 was \$64,024,527, which was equal to two-thirds (66.9 per cent) of the total value of products, while the value added by manufacture (that is, the value of products less the cost of materials) was \$31,672,095.

The value of products in 1909 was nearly eighteen times as great as that in 1879. The greatest actual increase in value of products was during the period 1904-1909, when the value increased from \$51,728,647 to \$95,696,622—a gain of \$43,967,975, or 85 per cent. This increase, while due largely to the increase in the quantity of coke produced and higher prices per ton, may be attributed to some extent to the utilization of by-products which has been made possible by the installation of ovens of more modern types. The total cost of materials increased from \$29,884,532 in 1904 to \$64,024,527 in 1909, or 114.2 per cent. During the same period the average number of wage earners increased 54.2 per cent, and the amount paid in wages 66.1 per cent. The quantity of coke produced increased 19,674,267 short tons, or 100.2 per cent, during the decade 1899-1909.

Summary, by states.—Table 2 summarizes the more important statistics by states, the states being arranged according to value of products in 1909. Certain states for which data can not be shown separately ranked higher than some of those named in the table.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.				VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹										
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.		
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States.	315	29,273	100.0	.....	.....	\$95,696,822	100.0	.....	.....	\$31,872,095	100.0	.....	.....	72.2	54.2	11.7	168.9	85.0	45.4	99.0	45.0	37.2
Pennsylvania.....	146	15,331	52.4	1	1	51,816,449	54.1	1	1	18,053,996	57.0	1	1	65.2	51.0	9.4	132.5	79.1	29.8	70.3	29.5	31.5
Alabama.....	35	2,580	8.8	3	3	8,842,512	9.2	2	2	2,471,035	7.8	3	2	62.1	19.2	36.0	137.3	43.2	65.7	135.0	13.5	107.0
West Virginia.....	71	4,426	15.1	2	2	7,563,419	7.9	3	3	2,550,946	8.1	2	3	41.4	74.7	-19.1	114.3	81.2	18.3	63.3	67.1	-2.2
Virginia.....	16	1,425	4.9	4	4	2,415,769	2.5	8	4	597,517	1.9	9	6	81.5	30.3	39.4	125.2	28.2	75.7	51.0	-14.8	77.3
Ohio.....	4	246	0.8	14	14	850,615	0.9	13	14	211,005	0.7	14	14	.....	117.7	.....	233.7	228.6	1.6	80.3	.....	-23.9
Tennessee.....	8	250	0.9	13	7	585,685	0.6	15	10	108,185	0.3	15	11	-47.6	-33.7	-21.0	-23.4	-27.7	5.0	-55.4	-45.7	-17.8
All other states.....	35	5,015	17.1	.....	.....	23,622,173	24.7	.....	.....	7,679,411	24.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 19. A minus sign (—) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value added by manufacture.

The production of coke was reported for 21 states in 1909; the data for but 6 states can be shown separately, however, without disclosing the operations of individual concerns. Pennsylvania is by far the most important state in the manufacture of coke, reporting 54.1 per cent of the total value of products in 1909.

The number of wage earners employed in the industry in Pennsylvania increased 65.2 per cent during the decade ending with 1909, and the value of products 132.5 per cent. Alabama ranked second in 1909 in value of products. West Virginia, although ranking third in value of products, was second in number of wage earners employed and in value added by manufacture. Of the states for which percentages are shown in the table, Ohio shows the largest percentage of gain during the decade 1899-1909 both in number of wage earners and in value of products, but in value added by manufacture Alabama shows the largest increase—135 per cent.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the manufacture of coke classified according to occupational status and sex and, in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	31,226	31,112	114
Proprietors and officials.....	814	807	7
Proprietors and firm members.....	101	96	5
Salaried officers of corporations.....	174	172	2
Superintendents and managers.....	539	539	.....
Clerks.....	1,139	1,037	102
Wage earners (average number).....	29,273	29,268	5
16 years of age and over.....	29,187	29,182	5
Under 16 years of age.....	86	86	.....

The average number of persons engaged in the manufacture of coke during 1909 was 31,226, of whom 29,273, or 93.7 per cent, were wage earners; 814, or 2.6 per cent, proprietors and officials; and 1,139, or 3.6

per cent, clerks, including other subordinate salaried employees. Of the total number of persons engaged in the industry, only 114, or four-tenths of 1 per cent, were females. The nature of the industry is such that but a small percentage of either women or children can be employed advantageously as wage earners.

The average number of wage earners, as reported at the censuses of 1909, 1904, and 1899, is given, by states, in Table 19. The distribution of the average number by sex and age is not shown for the individual states, but Table 20 gives such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of the persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	31,226	100.0	20,440	100.0	52.8
Proprietors and firm members.....	101	0.3	73	0.4	38.4
Salaried employees.....	1,852	5.9	1,386	6.8	33.6
Wage earners (average number).....	29,273	93.7	18,981	92.9	54.2

Table 5 shows the average number of wage earners in the industry distributed according to age, and in the case of those 16 years of age or over, according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	29,273	100.0	18,981	100.0	16,999	100.0
16 years of age and over.....	29,187	99.7	18,915	99.7	16,932	99.6
Male.....	29,182	99.7	18,915	99.7	16,932	99.6
Female.....	5	(¹)	.....	.....	.....	.....
Under 16 years of age.....	86	0.3	66	0.3	67	0.4

Less than one-tenth of 1 per cent.

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the coke industry on the 15th (or the nearest representative day) of each month during the year 1909, for the five states in which an average of 500 or more wage earners were employed during the year, for which figures can be shown separately.

The largest number of wage earners employed in the industry during any month of 1909 was 33,094, in

December, and the smallest number 26,461, in April, the minimum number being equal to 80 per cent of the maximum. The industry is not subject to any great seasonal variation, but is considerably affected by fluctuations in the iron and steel industry. In 1904 the maximum number of wage earners, 21,420, was reported for December, and the minimum number, 16,893, for July, the minimum being equal to 78.9 per cent of the maximum.

Table 6 WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	29,273	27,668	27,121	27,003	26,461	27,022	28,301	29,106	29,475	30,852	32,390	32,799	33,094
Alabama.....	2,580	2,652	2,542	2,640	2,358	2,344	<i>2,264</i>	2,271	2,465	2,752	2,893	<i>2,399</i>	2,887
Colorado.....	893	828	800	796	774	718	824	950	870	851	1,074	1,047	957
Pennsylvania.....	15,331	13,790	13,687	13,581	<i>13,296</i>	14,060	15,321	15,781	15,943	16,483	17,162	17,347	17,521
Virginia.....	1,425	1,473	1,402	1,364	1,334	1,325	1,328	<i>1,309</i>	1,336	1,437	1,533	1,602	1,631
West Virginia.....	4,426	4,523	4,361	4,214	4,267	4,125	4,110	<i>4,069</i>	4,181	4,442	4,763	4,984	5,073

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The months of maximum and minimum employment for 1909 and the number of wage earners reported for these months are given in Table 20 for all states for which separate statistics can be shown.

Prevailing hours of labor.—In Table 7 the wage earners in the coke industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the prevailing hours in the establishment, even though a few employees worked a greater or a smaller number of hours.

Table 7 AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	29,273	1,837	359	7,965	149	11,629	3,904	3,280
Alabama.....	2,580	57	15	185	.....	825	1,007	491
Colorado.....	893	.....	.....	.....	.....	893	.....	.....
Pennsylvania.....	15,331	1,508	.....	7,397	100	4,575	658	1,093
Virginia.....	1,425	4	306	.....	33	766	.....	316
West Virginia.....	4,426	21	38	316	16	3,966	.....	69

More than three-fifths (64.3 per cent) of the wage earners engaged in the manufacture of coke in 1909 were in establishments where the prevailing number of hours was 60 or more per week. Only 8 per cent were employed in establishments where the prevailing hours were less than 54 per week. Wage earners in establishments where the prevailing hours were 60 per week constituted 39.7 per cent of the total number. This group was the most important in Virginia and West Virginia, and in Colorado it comprised all

the wage earners reported, but in Pennsylvania the wage earners in establishments where the prevailing hours per week were 54 formed the largest group. A considerable number of wage earners in this state, however, were in establishments which reported 48 hours a week or less, 60 hours a week, and 72 hours or over, respectively, as the prevailing hours of labor, 29.8 per cent of the total number of wage earners being reported in the 60-hour group. In Alabama the greatest number of wage earners, 39 per cent of the total, were employed in establishments which reported more than 60 but less than 72 hours per week as the prevailing hours of labor.

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of the coke establishments in the United States.

Table 8 NUMBER OF ESTABLISHMENTS. VALUE OF PRODUCTS.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	315	278	\$95,686,622	\$51,728,647
Individual.....	21	15	3,158,168	1,965,366
Firm.....	17	15	1,258,047	1,314,195
Corporation.....	1,277	248	1,91,280,407	48,449,086
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	6.7	5.4	3.3	3.8
Firm.....	5.4	5.4	1.3	2.5
Corporation.....	187.9	89.2	195.4	93.7

¹ Includes one establishment under cooperative ownership, to avoid disclosure of individual operations.

In 1909, of the total number of plants reported, 87.6 per cent were under corporate ownership, as compared with 89.2 per cent in 1904. The value of products of these establishments (including the one establishment under cooperative ownership in 1909) represented 95.4 per cent of the total value of products in 1909 and 93.7 per cent in 1904.

Table 9 gives statistics with regard to form of ownership for four of the leading states.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	21	17	277	1,241	562	27,470	\$3,158,168	\$1,268,047	\$91,280,407	\$661,910	\$364,320	\$30,645,885
Alabama.....			35			2,580			8,842,512			2,471,035
Pennsylvania.....	21	15	110	1,241	485	13,605	3,158,168	1,152,408	47,505,873	661,910	333,471	17,053,615
Virginia.....		1	15		(X)	1,485		(X)	2,416,769		(X)	697,617
West Virginia.....		1	70		(X)	4,486		(X)	7,663,419		(X)	2,660,948

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases, an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for establishments under corporate ownership include those for one establishment operated by a cooperative association.

In 1909, of the total number of wage earners reported for the industry, 4.2 per cent were employed in establishments under individual ownership, 1.9 per cent in those under firm ownership, and 93.8 per cent in those owned by corporations (including the establishment under cooperative ownership).

The 21 establishments under individual ownership were all reported from Pennsylvania, and of the 17 operated by firms, 15 were reported from that state and 1 each from Virginia and West Virginia.

Size of establishment.—Table 10 presents statistics for 1909 and 1904 for coke establishments grouped according to the value of their products.

In 1909, 5.4 per cent of the coke establishments manufactured products valued at \$1,000,000 or over, as against 1.8 per cent in 1904. While such establishments represented only a comparatively small proportion of the total number at both censuses, they reported 53.1 per cent of the total value of products in 1909 and 38.4 per cent in 1904. The increase in the importance of this class of establishments during the five-year period was in part, but by no means chiefly, due to advance in prices.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	315	278	\$95,698,622	\$51,726,647
Less than \$5,000.....	11	25	21,285	64,648
\$5,000 and less than \$20,000.....	40	38	1,262,249	423,706
\$20,000 and less than \$100,000.....	127	115	6,780,743	5,802,067
\$100,000 and less than \$1,000,000.....	120	95	36,845,746	25,580,267
\$1,000,000 and over.....	17	5	50,786,698	19,857,959
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	3.5	9.0	(¹)	0.1
\$5,000 and less than \$20,000.....	12.7	13.7	1.3	0.8
\$20,000 and less than \$100,000.....	40.3	41.4	7.1	11.2
\$100,000 and less than \$1,000,000.....	38.1	34.2	38.5	49.5
\$1,000,000 and over.....	5.4	1.8	53.1	38.4

¹ Less than one-tenth of 1 per cent.

The average value of products per establishment increased from \$186,074 in 1904 to \$303,799 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$78,576 to \$100,546. The average number of wage earners per establishment increased from 68.3 in 1904 to 92.9 in 1909.

Table 11 gives, by states, a classification of establishments according to the average number of wage earners employed in 1909.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—															
			1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.....	315	29,273	37	135	71	909	70	2,415	70	4,778	44	6,863	17	5,937	6	3,022	1	5,214
Alabama.....	35	2,580	1	9	8	109	8	272	10	758	6	902	2	530				
Colorado.....	12	893			3	47	2	55	6	422			1	369				
Pennsylvania.....	146	15,331	24	89	43	556	18	607	26	1,769	25	3,799	9	3,297			1	5,214
Virginia.....	16	1,425	1	4	3	24	3	119	4	265	4	697	1	316				
West Virginia.....	71	4,426	5	17	9	122	32	1,077	19	1,229	4	696			2	1,285		

Of the 315 establishments reporting, 34.3 per cent employed from 1 to 20 wage earners, 44.4 per cent from 21 to 100, and 21.3 per cent more than 100.

Of the total number of wage earners reported, 3.6 per cent were reported by establishments employing from 1 to 20, 24.6 per cent by establishments employing from 21 to 100, 43.7 per cent by establishments employing from 101 to 500, and 28.1 per cent by the six establishments employing more than 500 wage earners.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses for the coke industry in 1909 to have been \$84,839,245, distributed as follows: Cost of materials, \$64,024,527,

or 75.5 per cent; wages, \$15,454,345, or 18.2 per cent; salaries, \$2,072,150, or 2.4 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$3,288,223, or 3.9 per cent. There are some variations in the proportions for the different classes of expenses in the several states. In the six states shown in Table 20 the proportion of the total expenses represented by the cost of materials ranged from 68.6 per cent in West Virginia to 80 per cent in Tennessee.

Engines and power.—Table 12 presents statistics regarding power, as reported at the censuses of 1909, 1904, and 1899.

The total primary power increased from 34,767 horsepower in 1899 to 62,602 in 1909, or 80.1 per cent. In 1909 the power of steam engines constituted 71.2 per cent of the total primary horsepower, as compared with 89.7 per cent in 1904; on the other hand, there was a marked increase between 1904 and 1909 in the relative importance of the power of electric motors operated by purchased current (rented electric power). No rented electric power was reported in 1899, and only a small amount in 1904, but in 1909 this class represented 22 per cent of the total primary horsepower. A very large number of electric motors have

been installed to be operated by current generated by the establishments in which they are used.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	1,002	726	352	62,602	66,669	34,767	100.0	100.0	100.0
Owned.....	496	699	352	47,963	65,482	34,767	76.6	98.2	100.0
Steam.....	436	686	350	44,591	59,329	29,148	71.2	89.7	83.8
Gas.....	6	4	2	1,212	150	7	1.9	0.2	(¹)
Water wheels.....		8			178			0.3	
Water motors.....	4	1		500	10		0.8	(¹)	
Other.....				1,660	5,315	5,612	2.7	8.0	16.1
Rented.....	506	27		14,639	1,187		23.4	1.8	
Electric.....	506	27		13,754	1,187		22.0	1.8	
Other.....				885			1.4		
Electric motors.	1,538	383	68	41,084	10,509	1,482	100.0	100.0	100.0
Run by current generated by establishment.....	1,032	356	68	27,310	9,322	1,462	66.5	88.7	100.0
Run by rented power.....	506	27		13,754	1,187		33.5	11.3	

¹ Less than one-tenth of 1 per cent.

Table 13 presents statistics for 1909 with regard to power and fuel used in the coke industry in four of the leading states.

STATE.	PRIMARY HORSEPOWER.							ELECTRIC HORSEPOWER.		FUEL USED.						
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.				Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal, bituminous (short tons).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 cubic feet).	
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.								Other.
United States.....	139	62,602	47,963	44,591	1,212	500	1,660	13,764	885	41,084	27,310	59,030,005	34,632	84	21	5,615,712
Alabama.....	19	5,766	5,706	5,246			460		60	1,173	1,173	5,156,407				
Pennsylvania.....	26	26,091	18,777	17,075	2	500	1,200	6,489	825	14,865	8,376	36,886,592	13,668	50		348,958
Virginia.....	63	1,760	625	625				1,135		1,295	160	2,067,112				
West Virginia.....	28	5,307	3,981	3,981				1,326		5,242	3,916	6,372,577				6,000
All other states.....	20	23,678	18,874	17,664	1,210			4,804		18,489	13,685	8,547,317	20,964	34	21	5,260,754

In 1909 Pennsylvania ranked first with respect to the amount of power used, reporting 26,091 horsepower, or 41.7 per cent of the aggregate for the industry. Steam was the most important form of power in all of the states shown, with the exception of Virginia, where electric power was most largely used.

Fuel consumed.—Table 13 shows that 59,030,005 short tons of bituminous coal were consumed in the

manufacture of coke in 1909. These figures, however, do not include 566,539 tons used in establishments engaged primarily in the manufacture of products other than coke. The difference between this total and that shown in Table 14 as charged into the ovens, amounting to 241,607 tons, may be considered as the amount of coal used for fuel in heating boilers, retorts, etc.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

Materials used, for the United States as a whole.—Table 14 shows, for 1909, 1904, and 1899, the quantity and cost of the coal used in the manufacture of coke, including the small amount so used in establishments not assigned to the coke industry. The quantity of coal used in the manufacture of coke is, to a considerable extent, a matter of estimate, as a large proportion of the coal is charged directly into the ovens from the mines without being weighed or measured; in fact,

there are as yet comparatively few establishments in this country where the quantity of coal made into coke is accurately ascertained. Where mining and the manufacture of coke were conducted by the same concern, and separate accounts were not kept, the companies were required to estimate the quantity and value of coal used for coking purposes. In order to avoid a duplicate canvass the United States Geological Survey, which annually collects statistics

of the production of coke, and the Bureau of the Census cooperated in collecting data for the year 1909. The figures for coal used and coke produced are the same, therefore, in the reports of the two bureaus for 1909. The variations in the reports for other census years may be attributed to differences in the methods employed by the two bureaus.

MATERIAL.	1909	1904	1899	PER CENT OF INCREASE. ¹		
				1899-1909	1904-1909	1899-1904
Total cost.....	\$85,388,124	\$31,083,516	\$19,665,532	232.5	110.4	58.1
Coal charged into ovens:						
Total quantity, tons...	² 59,354,937	³ 37,376,251	30,157,829	96.8	58.8	23.9
Cost.....	² \$62,203,382	³ \$29,559,104	\$18,355,252	238.9	110.4	61.0
Run of mine, tons:						
Unwashed.....	40,594,842	25,165,692	20,844,637	94.7	61.3	20.7
Washed.....	6,007,760	2,902,721	1,457,961	312.1	107.0	99.1
Slack, tons:						
Unwashed.....	6,926,484	4,459,784	5,036,675	37.5	55.3	-11.5
Washed.....	5,825,851	4,848,054	2,818,556	106.7	20.2	72.0
All other materials.....	\$3,184,742	\$1,524,411	\$1,310,280	143.1	108.9	16.3

¹ A minus sign (-) denotes decrease.

² Includes 566,539 tons of coal, valued at \$1,363,597, used by establishments engaged primarily in the manufacture of products other than coke.

³ Includes 595,245 tons of coal, valued at \$1,198,983, used by establishments engaged primarily in the manufacture of products other than coke.

Coal is the only material of much importance. The total amount used in the manufacture of coke in 1909, as reported, was 59,354,937 tons, as compared with 37,376,251 tons in 1904 and 30,157,829 tons in 1899, the increase for the decade being 96.8 per cent. The cost increased much more, relatively, than the quantity. More than two-thirds (68.4 per cent) of the total quantity of coal used for coking in 1909 was run of mine unwashed.

Products, for the United States as a whole.—Table 15 shows the quantity and value of the products of the coke ovens for 1909, 1904, and 1899, the figures including the products of ovens operated by establishments assigned to other industries, as well as of those operated by establishments in the coke industry proper. The figures do not, however, include the products of establishments in the illuminating gas industry, which make coke and various by-products incidentally to the manufacture of gas. In comparing the values of coke shown in the table with the quantities, it should be borne in mind that a great many coke-manufacturing concerns are controlled by large iron and steel companies and that the prices fixed for the coke may in some such cases be on an arbitrary basis not conforming to market prices. Moreover, while the schedule called for the selling value of the product at the works, it was not always possible to obtain this value, and in some instances the amount received at the place of delivery was reported.

The total quantity of oven coke reported for 1909, 39,315,065 short tons, represents an increase of 19,674,267 tons, or 100.2 per cent, over the amount reported in 1899. An average of practically one and one-half tons of coal was used per ton of coke produced in each of the three census years. By reason of the increased use of retort ovens and improvement in the

character of the retorts used, a large gain is shown in the quantity of by-products reported. These by-products consist principally of ammonium sulphate, gas, and tar. Taking into consideration the amount of gas used in the establishments in which it is produced, gas is the most important by-product of the retort ovens. Of the by-products sold, the various ammonia products were the most important, their value having increased from \$1,581,581 in 1904 to \$3,675,771 in 1909—a gain of 132.4 per cent. In calling for the returns of ammonia liquor, the strength was asked for. Ammonium sulphate is preferred as a base for reference, and in 1904 the ammonium products were estimated as the equivalent of 62,633,417 pounds of ammonium sulphate. In 1909 the production of 4,871,014 pounds of anhydrous ammonia was specifically reported, and the balance of the ammonia products were the equivalent of 123,111,197 pounds of ammonium sulphate. The total value of by-products reported increased from \$3,150,485 in 1904 to \$8,112,900 in 1909, or 157.5 per cent.

PRODUCT.	1909	1904	1899
Total value.....	¹ \$98,078,383	² \$53,455,108	\$35,585,445
Coke:			
Tons (2,000 pounds).....	39,315,065	25,143,288	19,640,798
Value.....	³ \$89,965,483	\$50,304,623	\$34,633,418
Made in beehive ovens—			
Tons.....	33,060,421	22,674,902	(⁴)
Value.....	\$69,530,794	\$43,340,661	(⁴)
Made in retort or by-product ovens—			
Tons.....	6,254,644	2,468,386	(⁴)
Value.....	\$20,434,689	\$6,963,962	(⁴)
By-products obtained from retort or by-product ovens:			
Gas made, thousand cubic feet.....	76,590,763	20,174,563	(⁴)
Used in process or wasted, thousand cubic feet.....	60,799,543	15,711,501	(⁴)
Sold—			
Thousand cubic feet.....	15,791,220	4,463,062	1,171,943
Value.....	\$2,609,211	\$843,787	\$225,022
Tar—			
Gallons.....	60,126,006	26,223,323	10,468,733
Value.....	\$1,408,611	\$618,388	\$207,952
Ammonia products.....	\$3,675,771	⁶ \$1,581,581	\$511,563
Ammonium sulphate—			
Pounds.....	⁶ 123,111,197	31,546,781	11,984,931
Value.....	\$3,227,316	\$818,290	\$330,921
Anhydrous ammonia—			
Pounds.....	4,871,014	(⁴)	(⁴)
Value.....	\$448,455	(⁴)	(⁴)
Ammonia liquor—			
Gallons.....	(⁷)	4,791,468	1,572,325
Value.....	(⁷)	\$763,291	\$180,642
All other.....	\$419,307	\$111,729	\$7,490

¹ Includes products valued at \$2,381,761 reported by establishments engaged primarily in the manufacture of products other than coke, as follows: Retort coke, 415,472 tons, valued at \$1,464,162; tar, 4,398,576 gallons, valued at \$37,639; ammonium sulphate, 9,952,744 pounds, valued at \$235,605; gas sold, 2,160,915,000 cubic feet, valued at \$534,075; and other products to the value of \$60,280.

² Includes products valued at \$1,726,461 reported by establishments engaged primarily in the manufacture of products other than coke, viz: Coke made in beehive ovens, 158,622 tons, valued at \$454,888; coke made in retort or by-product ovens, 251,603 tons, valued at \$847,684; tar, 3,149,098 gallons, valued at \$61,552; ammonium sulphate, 5,496,068 pounds, valued at \$136,863; ammonia liquor, 451,789 gallons, valued at \$65,647; gas sold, 580,262,000 cubic feet, valued at \$159,323; and other products to the value of \$504.

³ In addition, 82,049,633 bushels of gas-house coke to the value of \$5,723,215 were made for sale by establishments engaged primarily in the manufacture of illuminating gas.

⁴ Not reported.

⁵ Represents 62,633,417 pounds of ammonium sulphate or reduced equivalent in sulphate.

⁶ Includes the reduced equivalent of ammonia liquor in sulphate and not comparable with prior censuses.

⁷ Reported in part as anhydrous ammonia and in part as ammonium sulphate or reduced equivalents.

Materials, products, and equipment, by states.—Table 16 shows, by states, the total number of ovens, the total amount of coal used, the coke produced, and its value, for 1909, 1904, and 1899. The figures include the data for coke manufactured by establishments engaged primarily in other industries (except the

illuminating gas industry) as well as that made by establishments in the coke industry.

Of the total production of coke in 1909, amounting to 39,315,065 tons, Pennsylvania contributed 24,905,525 tons, or 63.3 per cent, the next states in importance in the output of coke being West Virginia and Alabama.

In the United States as a whole the yield of coke in 1909 was equal in weight to 66.2 per cent of the coal consumed, as compared with 67.3 per cent in 1904 and 65.1 per cent in 1899. The changes from census to census in the yield of coke are affected by changes in the relative importance of the different kinds of coal used. The high grade of coal used for coke in Pennsylvania is indicated by the fact that the yield in that state (67.3 per cent) in 1909 was higher than in any other state for which figures are shown separately, although not so high as that shown for "all other states." Ohio shows a marked increase in the yield of coke from coal during the decade, the percentage being 58.8 in 1899 and 65.4 in 1909. In Alabama, Virginia, and West Virginia, the yield in 1909 was higher than in 1899, but in Pennsylvania and Tennessee it was lower in 1909 than in either of the two preceding census years.

Table 16

STATE AND CENSUS.	Ovens (number). ²	Coal used (short tons). ³	COKE PRODUCED. ¹			
			Amount (short tons).	Yield of coal in coke (per cent).	Value.	Average value per ton.
United States:						
1909.....	103,982	59,354,937	39,315,065	66.2	\$89,965,493	\$2.29
1904.....	77,481	37,378,251	25,143,289	67.3	50,304,623	2.00
1899.....	47,811	30,157,829	19,640,798	65.1	34,635,418	1.78
Alabama:						
1909.....	10,061	5,080,764	3,085,824	60.7	8,068,267	2.61
1904.....	7,126	4,027,656	2,335,613	58.0	5,731,329	2.45
1899.....	5,296	3,028,472	1,787,809	59.0	3,634,471	2.03
Ohio:						
1909.....	447	340,735	222,711	65.4	683,155	3.07
1904.....	361	203,032	120,631	59.4	355,524	2.95
1899.....	244	142,678	83,878	58.8	255,129	3.04
Pennsylvania:						
1909.....	54,506	36,983,568	24,905,525	67.3	50,377,035	2.02
1904.....	41,995	23,128,917	16,308,934	70.5	28,700,801	1.76
1899.....	27,156	19,490,030	13,245,594	68.0	22,039,151	1.66
Tennessee:						
1909.....	2,729	493,283	261,808	53.1	667,723	2.55
1904.....	1,774	573,629	324,451	56.6	809,801	2.50
1899.....	1,727	684,821	380,525	55.6	764,890	2.01
Virginia:						
1909.....	5,469	2,060,518	1,347,478	65.4	2,415,769	1.79
1904.....	4,111	1,876,256	1,139,010	67.9	1,882,849	1.65
1899.....	1,588	994,635	618,707	62.2	1,071,284	1.73
West Virginia:						
1909.....	20,283	6,361,759	3,943,948	62.0	7,525,922	1.91
1904.....	14,452	3,746,602	2,355,146	62.9	4,141,032	1.76
1899.....	8,231	3,792,825	2,278,679	60.1	3,470,405	1.52
All other states:						
1909.....	10,487	8,034,310	5,547,771	69.0	20,227,612	3.65
1904.....	7,642	4,020,159	2,559,503	63.7	8,683,288	3.39
1899.....	3,569	2,024,368	1,245,606	61.5	3,398,088	2.73

¹ Includes 566,539 tons of coal in 1909, and 595,245 tons of coal in 1904, used in establishments engaged primarily in manufacturing products other than coke.
² Includes 8,311 idle ovens, and 242 ovens reported by establishments engaged primarily in the manufacture of products other than coke in 1909; 14,488 idle ovens, and 1,362 ovens reported by establishments engaged primarily in the manufacture of products other than coke in 1904; and 669 idle ovens in 1899. The number of ovens operated by establishments in other industries in 1899 can not be determined.
³ Includes 415,472 tons of coke, valued at \$1,464,182, in 1909, and 410,225 tons of coke, valued at \$1,302,572, in 1904, produced in establishments engaged primarily in manufacturing products other than coke.

The average value of coke for the United States as a whole increased from \$1.76 per short ton in 1899 to \$2.29 in 1909; and in each state there was an increase in the average during the decade and during each of the five-year periods, except that in Virginia and Ohio the average was lower in 1904 than in 1899. There is a

considerable difference among the states with respect to the average value of coke per ton.

Table 17 presents, for the United States as a whole, statistics with respect to the number of coke ovens in 1909, 1904, and 1899, and Table 18 shows, for the United States as a whole and for individual states, the number of beehive ovens and of other styles of ovens, respectively, for each year.

Table 17

CLASS.	COKE OVENS.		
	1909	1904	1899
Ovens in existence at end of year ¹	103,982	77,461	47,811
Ovens building at end of year.....	2,950	2,127	(²)
Ovens abandoned during year.....	201	178	(²)

¹ Includes 8,311 idle ovens and 242 ovens reported by establishments engaged primarily in the manufacture of products other than coke in 1909; 14,488 idle ovens and 1,362 ovens reported by similar establishments in 1904; and 669 idle ovens in 1909.
² Not reported.

Notwithstanding the much larger capacity of the by-product ovens, this type showed a greater percentage of increase in number from 1899 to 1909 than the beehive type. The latter type increased from 46,345 in 1899 to 99,993 in 1909, or 115.8 per cent, as compared with an increase from 1,466 to 3,989, or 172.1 per cent, in by-product ovens during the same period. In 1909 Pennsylvania reported 53.2 per cent of the total number of beehive ovens and 32.5 per cent of the by-product ovens, as compared with 55.2 per cent and 24.8 per cent, respectively, in 1904. No beehive ovens were reported from Maryland, Massachusetts, Michigan, Minnesota, New Jersey, or New York at either census, while the beehive type only was used in 1909 in 12 of the 26 states reporting coke as a product. Colorado, which reported 42 by-product ovens in 1904 and none in 1909, is the only state in which their use has been discontinued.

Table 18

STATE.	1909 ¹		1904 ²		1899 ³	
	Beehive.	By-product and other styles.	Beehive.	By-product and other styles.	Beehive.	By-product and other styles.
United States.....	99,893	3,999	74,986	2,495	46,345	1,466
Alabama.....	9,781	280	6,886	240	4,962	334
Colorado.....	3,846	.....	3,276	42	1,203	40
Georgia.....	350	.....	501	.....	350	.....
Illinois.....	28	440	.....	24	130	.....
Indiana.....	46	50	.....	.....	12	.....
Kansas.....	67	.....	72	.....	86	.....
Kentucky.....	494	.....	498	.....	300	.....
Maryland.....	.....	200	.....	200	.....	.....
Massachusetts.....	.....	400	.....	400	.....	400
Michigan.....	.....	162	.....	120	.....	.....
Minnesota.....	.....	50	.....	50	.....	.....
Missouri.....	4	.....	.....	.....	12	.....
Montana.....	551	.....	315	.....	308	.....
New Jersey.....	.....	150	.....	100	.....	.....
New Mexico.....	1,030	.....	284	.....	190	.....
New York.....	.....	556	.....	419	.....	25
Ohio.....	322	125	281	80	244	.....
Oklahoma.....	536	.....	286	.....	130	.....
Pennsylvania.....	53,210	1,296	41,375	620	26,801	355
Tennessee.....	2,729	.....	1,774	.....	1,727	.....
Utah.....	854	.....	504	.....	104	.....
Virginia.....	5,469	.....	4,111	.....	1,528	60
Washington.....	285	.....	169	.....	90	.....
West Virginia.....	20,163	120	14,332	120	7,979	252
Wisconsin.....	228	160	228	80	120	.....
Wyoming.....	.....	74	.....	74	.....	.....

¹ Figures include 8,311 idle ovens and 242 ovens reported by establishments engaged primarily in manufacturing products other than coke.
² Figures include 14,488 idle ovens and 1,362 ovens—1,070 beehive and 292 by-product—operated by establishments engaged primarily in manufacturing products other than coke.
³ Figures include 669 idle ovens.

MANUFACTURES.

DETAILED STATE TABLES.

The principal data secured for the coke industry are presented in Tables 19 and 20.

Table 19 shows for 1909, 1904, and 1899 the number of establishments, persons engaged in the industry,

horsepower, capital, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 20 gives more detailed statistics for the industry for 1909 only.

COKE—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1909	315	31,226	101	1,852	29,273	62,602	\$152,321	\$2,072	\$15,454	\$64,026	\$95,697	\$31,672
	1904	278	20,440	73	1,338	18,851	66,869	90,713	1,248	9,304	29,885	51,729	21,844
	1899	241	17,962	48	915	18,999	34,767	36,503	797	7,088	19,666	35,555	15,919
Alabama.....	1909	35	2,800	.....	.....	220	5,766	17,770	226	1,283	6,371	8,843	2,472
	1904	24	2,272	.....	.....	107	3,075	3,425	96	924	3,997	6,175	2,178
	1899	15	1,637	2	.....	43	692	3,855	40	536	2,674	3,726	1,052
Ohio.....	1909	4	259	.....	.....	13	246	1,238	18	120	640	851	211
	1904	4	126	1	.....	12	113	584	13	54	170	259	89
	1899	5	85	.....	.....	14	71	85	19	33	138	255	117
Pennsylvania.....	1909	146	16,219	83	805	15,331	26,091	68,023	943	8,436	33,762	51,816	18,054
	1904	110	10,975	72	749	10,154	44,478	56,839	734	5,173	14,979	28,924	13,945
	1899	89	9,841	40	518	9,283	24,525	20,213	481	4,517	11,678	22,282	10,604
Tennessee.....	1909	8	270	.....	.....	20	250	858	14	87	478	586	108
	1904	9	416	.....	.....	39	377	405	24	129	611	810	199
	1899	8	499	.....	.....	22	477	630	14	128	523	765	242
Virginia.....	1909	16	1,553	5	123	1,425	1,760	6,287	109	543	1,818	2,416	598
	1904	13	1,164	.....	.....	70	1,094	4,830	58	440	1,183	1,885	702
	1899	5	808	.....	.....	23	785	1,349	26	226	677	1,073	396
West Virginia.....	1909	71	4,746	2	318	4,426	5,307	12,821	281	1,664	5,012	7,563	2,551
	1904	74	2,764	.....	.....	231	2,533	8,064	160	1,004	2,647	4,174	1,527
	1899	77	3,340	1	208	3,131	4,055	4,453	127	890	1,967	3,529	1,562
All other states.....	1909	35	5,379	11	353	5,015	22,058	45,324	481	3,321	15,944	23,622	7,678
	1904	44	2,723	.....	.....	178	2,545	17,601	163	1,580	6,298	9,502	3,204
	1899	42	1,752	5	87	1,660	3,461	6,038	90	756	2,009	3,955	1,946

COKE—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.								WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.	
								Maximum month.	Minimum month.						
United States..	315	31,226	101	713	1,037	102	29,273	De 33,094	Ap 24,461	33,222	33,119	6	97	62,602	
Alabama.....	35	2,800	.....	83	120	17	2,580	No 2,899	Je 2,254	3,019	2,941	.....	78	5,766
Ohio.....	4	259	.....	7	4	2	246	Ap 300	Au 219	240	240	.....	.....	1,250
Pennsylvania.....	146	16,219	83	364	406	35	15,331	De 17,521	Ap 13,296	17,562	17,558	3	1	26,091	
Tennessee.....	8	270	.....	9	11	.....	250	No 325	Jy 205	322	322	.....	.....	370
Virginia.....	16	1,553	5	34	86	3	1,425	De 1,631	Jy 1,309	1,631	1,625	.....	6	1,760
West Virginia.....	71	4,746	2	134	174	10	4,426	De 5,073	Jy 4,069	6,072	5,071	.....	1	5,307
All other states ¹	35	5,379	11	82	236	35	5,015	.....	.....	5,376	5,362	3	11	22,058

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States..	\$152,321,337	\$84,839,245	\$1,194,758	\$877,394	\$15,454,345	\$60,905,891	\$3,118,636	\$250,011	\$579,327	\$17,929	\$2,440,456	\$95,698,622	\$31,672,095
Alabama.....	17,770,498	8,233,965	133,597	92,697	1,282,594	6,100,324	271,153	16,345	33,831	.....	303,424	8,842,512	2,471,035
Ohio.....	1,238,106	808,352	13,840	4,788	119,852	616,101	23,509	450	2,327	.....	27,485	850,615	211,005
Pennsylvania.....	68,023,289	44,512,168	594,358	348,150	8,435,604	32,488,287	1,277,166	105,353	310,705	17,929	937,617	51,816,449	18,053,996
Tennessee.....	857,614	597,122	9,863	4,504	86,784	468,960	8,540	.....	3,558	.....	14,913	888,685	108,185
Virginia.....	6,286,982	2,646,821	50,650	58,825	542,747	1,728,106	90,146	.....	18,790	.....	157,557	2,415,769	597,517
West Virginia.....	12,820,651	7,306,687	154,532	126,154	1,664,152	4,720,282	202,101	.....	61,203	.....	298,173	7,563,419	2,550,946
All other states ¹	45,324,197	20,734,129	237,916	242,276	3,322,612	14,786,831	1,155,931	127,863	159,413	.....	701,287	23,622,173	7,679,411

¹ All other states embrace: Colorado, 12 establishments; Georgia, 1; Illinois, 2; Indiana, 1; Kentucky, 4; Maryland, 1; Massachusetts, 1; Minnesota, 1; Montana, 1; New Jersey, 1; New Mexico, 2; New York, 2; Utah, 1; Washington, 3; Wisconsin, 2.

GAS, ILLUMINATING AND HEATING

(635)

THE MANUFACTURE OF GAS.

GENERAL STATISTICS.

Scope of the industry.—The census classification "gas, illuminating and heating" covers establishments making gas for sale for light, heat, or power, including some establishments operated by municipal governments. It covers the production of gas by various processes, including the destructive distillation of coal, wood, resins, oils, or other carbonaceous substances; the action of steam upon incandescent carbon or carbon-containing substances; the volatilization, or cracking, of petroleum or the petroleum distillates; and the action of water upon substances like calcium carbide.

The production of gas for the exclusive consumption of the same concern is not covered. Many residences, hotels, and mercantile establishments have plants for making acetylene or other gas for heat, light, or power, and many manufacturing and other industrial concerns make gas—usually "producer" gas—in large quantities for use as fuel in their own establishments. The increased use of gas engines for generating power has led to a marked development in such production of gas by establishments for their own consumption.

The gas produced in by-product coke plants, also, except a comparatively small proportion which is sold to gas companies and by them in turn sold to their customers, does not figure in this report. The quantity manufactured by this process is given in Table 15. Blast furnace gas also is not covered by the statistics.

A further class of establishments which is not included in the tables consists of those engaged in selling gas which has been purchased from establishments that manufacture it. The business is merchandising and not manufacture, and the gas they sell has been reported by the establishments that manufacture it. They are noted here only because they own and use in the distribution of the purchased gas, apparatus

and appliances—holders, mains, service pipes, meters, cylinders, etc.—such as in other cases would be owned by the gas manufacturers. Fifty-one such establishments were reported in 1909. The total capital of these establishments was \$15,297,324; the quantity of gas sold by them was 3,273,618,000 cubic feet, having a value of \$3,605,635; and their receipts from rents and sales of lamps and appliances totaled \$19,843, and from all other products \$38,719. In general, however, the concerns covered by the tables distribute the gas which they manufacture directly to the consumer, and a large part of their capital and expenses is connected with the process of distribution.

Establishments in the industry produce not only straight coal gas, straight water gas, carbureted water gas, mixed coal and water gas, oil gas, and acetylene gas, but also as by-products tar, pitch, benzol, hydrocarbons, ammonia water, ammonium sulphate, coke, cyanides, and other products.

Statistics of this industry were secured at the census of 1849, and at each subsequent census except that of 1879. In 1889 it was for the first time made the subject of a special report, which was purely statistical. A second special report was made at the census of 1899 which embraced, besides a presentation and discussion of the statistics which had been collected, a history and description of the industry.

Comparative summary for the United States.—Table 1 summarizes the statistics of the gas-manufacturing industry for each census from 1859 to 1909, inclusive, except for 1879, when no statistics were reported for the industry.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	NUMBER OR AMOUNT. ¹						PER CENT OF INCREASE. ²					
	1909	1904	1899	1889	1869	1859	1899-1909	1904-1909	1899-1904	1889-1899	1869-1889 ¹	1859-1869
Number of establishments.....	1,296	1,019	877	742	390	221	47.8	27.2	16.2	18.2	90.3	76.5
Persons engaged in the industry.....	51,007	40,043	28,363	(³)	(³)	(³)	79.8	27.4	41.2	.....	.....	.....
Proprietors and firm members.....	277	71	.....	(³)	(³)	(³)	(⁴)	290.1	.....	.....	.....	.....
Salaried employees.....	13,515	9,406	5,904	(³)	(³)	(³)	128.9	43.7	59.3	.....	.....	.....
Wage earners (average number).....	37,215	30,566	22,459	12,996	8,723	5,730	65.7	21.8	36.1	72.8	(⁵)	(⁵)
Primary horsepower.....	128,350	73,101	31,797	26,475	2,768	(³)	303.7	75.6	129.9	20.1	.....	.....
Capital.....	\$915,536,762	\$725,035,204	\$567,000,506	\$258,771,795	\$71,773,694	\$28,848,726	61.5	26.3	27.9	119.1	260.5	148.8
Expenses.....	\$113,500,978	\$92,258,955	\$53,084,174	(³)	(³)	(³)	113.8	23.0	73.8	.....	.....	.....
Services.....	\$33,316,068	\$25,521,616	\$17,709,796	(³)	(³)	(³)	88.1	30.5	44.1	.....	.....	.....
Salaries.....	\$12,385,371	\$8,463,699	\$5,273,500	(³)	(³)	(³)	134.9	46.3	60.5	.....	.....	.....
Wages.....	\$20,930,697	\$17,057,917	\$12,436,296	\$8,499,625	\$6,546,734	\$2,321,536	68.3	22.7	37.2	46.3	29.8	182.0
Materials.....	\$52,427,844	\$37,180,066	\$20,605,356	\$14,037,087	\$10,869,373	\$3,667,630	154.4	41.0	80.4	46.8	29.1	196.4
Miscellaneous.....	\$27,757,066	\$29,557,273	\$14,769,022	\$7,799,385	(³)	(³)	87.9	-6.1	100.1	89.4	.....	.....
Value of products.....	\$166,814,371	\$125,144,945	\$75,716,693	\$56,987,290	\$32,048,851	\$12,016,353	120.3	33.3	65.3	32.9	77.8	166.7
Value added by manufacture (value of products, less cost of materials).....	\$114,386,527	\$87,964,879	\$55,111,337	\$42,950,203	\$21,179,478	\$8,348,723	107.6	30.0	59.6	28.3	102.8	153.7
Quantity of gas made (1,000 cubic feet).....	150,835,793	112,549,979	67,093,553	36,519,512	(³)	(³)	124.8	34.0	67.8	83.7	.....	.....

¹ No statistics reported for this industry in 1879.

² A minus sign (-) denotes decrease. Where percentages are omitted comparable figures are not available.

³ Comparable figures not available.

⁴ None reported in 1899.

⁵ Percentage omitted because figures are not strictly comparable.

In determining the rank of the states, all states are considered, regardless of whether or not they are shown separately in the tables; hence some omissions occur in the several series of numbers indicating rank, as certain states included under "all other states" held a higher rank in some items than some of the states for which separate figures are given.

The industry is well distributed throughout the United States, some establishments being reported for every state. New York is the most important state in the manufacture of gas; in 1909 it reported 25.4 per cent of the total value of products. Illinois, which ranked second, reported about one-eighth of the total value of products, but reported nearly as many wage earners as New York. Pennsylvania, Massachusetts, and New Jersey were third, fourth, and fifth in rank in 1909 with respect to wage earners, value of products, and value added by manufacture. Together, these five leading states reported 53.9 per cent of the wage earners in the industry, 60 per cent of the value of products, and 59.6 per cent of the value added by manufacture.

Most of the states held the same, or practically the same, rank in respect to value added by manufacture in 1909 as in respect to value of products. Colorado was the most conspicuous exception, ranking twen-

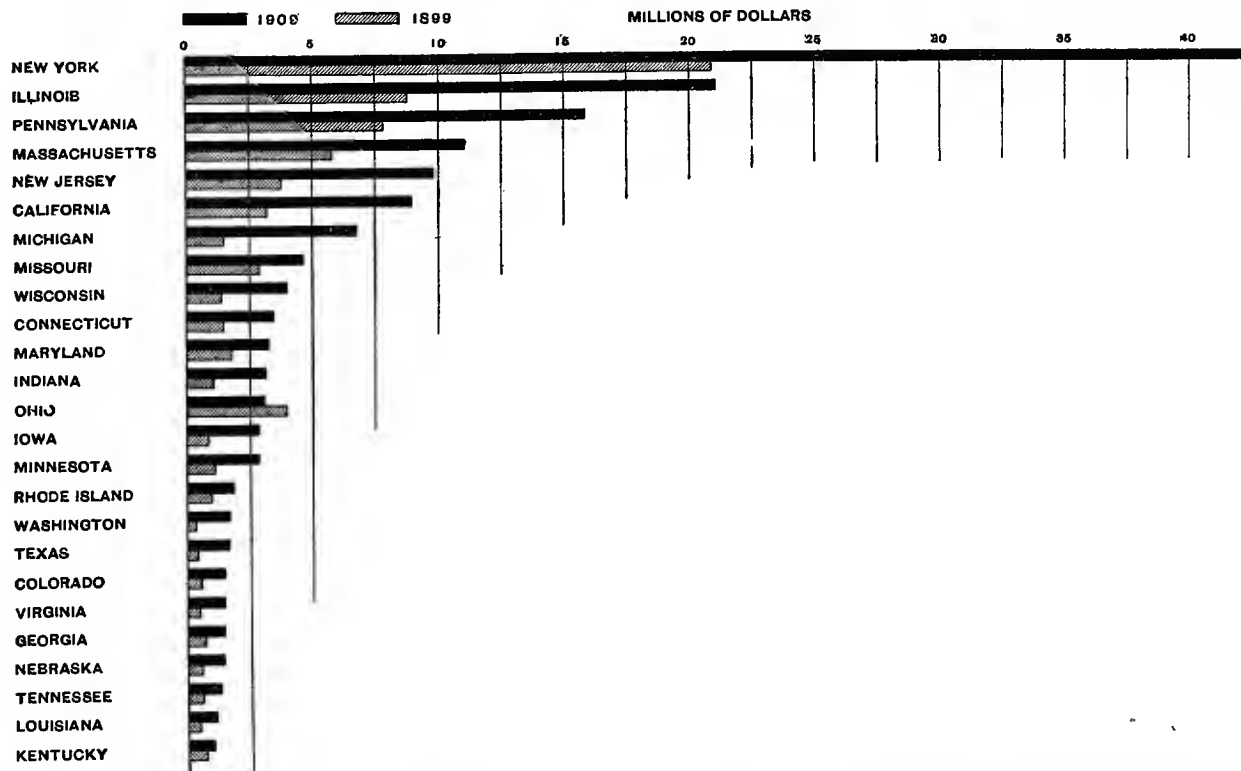
tieth in value of products and twenty-fourth in value added by manufacture.

Remarkable increases in value of products between 1899 and 1909 are shown for the following states: Michigan, 358.1 per cent; Washington, 432.9 per cent; Texas, 332.6 per cent; and Oregon, 419.4 per cent. On the other hand, conspicuous decreases occurred during the decade in Ohio and Kansas, presumably because of the substitution of natural for manufactured gas.

A few of the less important states advanced notably in rank in this industry, as measured by value of products, from 1904 to 1909—Washington, from twenty-sixth place to eighteenth place; Texas, from twenty-fifth to nineteenth; Utah, from thirty-seventh to thirty-third; Vermont, from fortieth to thirty-sixth; and Mississippi, from forty-first to thirty-eighth. Ohio dropped from eighth place in 1904 to thirteenth in 1909; Minnesota, from twelfth to fifteenth; Georgia, from eighteenth to twenty-second; Kentucky, from twentieth to twenty-sixth; Arkansas, from thirty-fourth to thirty-ninth; Kansas, from twenty-seventh to fortieth; and West Virginia, from thirty-eighth to forty-first.

The diagram below shows graphically the value of products reported for the most important states in the industry in 1909 and 1899.

GAS, ILLUMINATING AND HEATING—VALUE OF PRODUCTS, FOR LEADING STATES: 1909 AND 1899.



Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status, sex, and age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate.

The average number of persons engaged in the gas industry during 1909 was 51,007, of whom 37,215, or

73 per cent, were wage earners; 2,986, or 5.9 per cent, proprietors and officials; and 10,806, or 21.2 per cent, clerks. Of the total number of persons engaged in the industry, 49,231, or 96.5 per cent, were males, and 1,776, or 3.5 per cent, females, almost all of the latter being clerks. The average number of wage earners under 16 years of age was only 17. This industry requires, in the manufacturing process, only

a comparatively small number of wage earners, much the larger number, together with most of the clerks, being employed in the distribution service.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	51,007	49,231	1,776
Proprietors and officials.....	2,986	2,967	19
Proprietors and firm members.....	277	273	4
Salaried officers of corporations.....	990	981	9
Superintendents and managers.....	1,719	1,713	6
Clerks ¹	10,806	9,121	1,685
Wage earners (average number).....	37,215	37,143	72
16 years of age and over.....	37,198	37,127	71
Under 16 years of age.....	17	16	1

¹ Includes stenographers and other subordinate salaried employees.

The average number of wage earners in each state for the censuses of 1909, 1904, and 1899 is given in Table 21. The distribution of the average number by sex and age is not shown for the individual states, but Table 22 gives such a distribution for 1909 for the number employed on December 15, or the nearest representative day.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4. Comparable figures for 1899 are not available. The table shows that salaried employees increased about twice as rapidly as wage earners.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	51,007	100.0	40,043	100.0	27.4
Proprietors and firm members.....	277	0.5	71	0.2	290.1
Salaried employees.....	13,515	26.5	9,406	23.5	43.7
Wage earners (average number).....	37,215	73.0	30,566	76.3	21.8

STATE.	WAGE EARNERS IN THE INDUSTRY.												
	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	37,216	33,115	32,562	34,314	37,422	39,468	40,412	40,225	38,488	37,800	38,065	37,586	37,122
California.....	1,668	1,820	1,611	1,605	1,603	1,593	1,662	1,674	1,644	1,701	1,711	1,786	1,731
Connecticut.....	928	749	733	749	916	981	982	1,008	1,069	1,039	1,004	963	915
Illinois.....	8,301	5,106	<i>5,013</i>	5,878	6,823	7,129	7,135	7,039	6,869	6,648	6,314	6,074	5,735
Indiana.....	928	739	815	899	911	957	1,012	1,004	968	967	934	901	969
Iowa.....	806	<i>662</i>	654	701	814	877	918	970	851	814	839	784	796
Massachusetts.....	2,292	2,079	2,027	<i>2,020</i>	2,188	2,423	2,492	2,641	2,382	2,323	2,395	2,361	2,269
Michigan.....	1,771	1,568	1,538	<i>1,514</i>	1,743	1,838	1,900	1,780	1,738	1,780	1,877	1,874	1,974
Minnesota.....	848	770	790	<i>756</i>	839	956	963	915	878	877	819	804	805
Missouri.....	941	732	799	762	879	973	1,136	1,082	988	992	1,042	980	867
New Jersey.....	1,917	<i>1,864</i>	1,871	1,896	1,932	1,939	1,974	1,965	1,944	1,923	1,910	1,909	1,892
New York.....	6,422	5,769	<i>5,538</i>	5,619	6,313	6,738	6,960	6,881	6,583	6,535	6,736	6,807	6,590
Ohio.....	866	755	760	888	805	802	734	<i>485</i>	484	534	564	686	619
Pennsylvania.....	3,119	2,859	<i>2,784</i>	2,873	3,134	3,281	3,282	3,406	3,195	3,150	3,189	3,158	3,119
Texas.....	575	431	<i>404</i>	520	685	612	696	704	689	589	558	534	473
Wisconsin.....	1,063	928	<i>925</i>	944	1,088	1,117	1,154	1,172	1,144	1,102	1,079	1,066	1,044

NOTE.—The month of maximum employment for each state is shown by boldface figures and that of minimum employment by italic figures.

Table 5 shows the average number of wage earners distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. (See Introduction.)

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	37,215	100.0	30,568	100.0	22,469	100.0
16 years of age and over.....	37,198	100.0	30,557	100.0	22,456	99.9
Male.....	37,127	99.8	30,524	99.9	22,446	99.9
Female.....	71	0.2	33	0.1	10	(¹)
Under 16 years of age.....	17	(¹)	9	(¹)	3	(¹)

¹ Less than one-tenth of 1 per cent.

Wage earners employed, by months.—Table 6 gives the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 for the 15 states in which 500 or more wage earners were employed during the year. The District of Columbia, in which an average of more than 500 wage earners were employed in the gas industry in 1909, is omitted from the table, as its inclusion would disclose individual operations.

In the United States as a whole the largest number of wage earners reported for any month of 1909 was 40,412, in June, and the smallest number 32,562, in February, the minimum number being equal to 80.6 per cent of the maximum. In 1904 the maximum number of wage earners, 32,449, was reported in July and the minimum, 28,115, forming 86.6 per cent of the maximum, in February. Although more gas is usually consumed in winter than in summer, most of the work connected with the distributing system is outdoor work and subject to seasonal and weather conditions; therefore the maximum of employment for outside workers, and also for all wage earners combined, occurs during the summer months, when the works and mains are put in repair and extended, and the minimum during the winter, when such work, in a large measure, is impracticable.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for 46 states in Table 22.

Prevailing hours of labor.—Satisfactory statistics regarding the prevailing hours of labor in establishments manufacturing gas can not be presented. While in most industries the great majority of the wage earners in any given establishment work for the same number of hours weekly, this is by no means generally true in the gas industry. The census schedule did not call for the number of wage earners working a specified number of hours, but called only for the hours generally prevailing in the establishment. The employees known as "gasmen" or "gas makers"—that is, those who work in the manufacturing branch of the business—work more hours per week than the yard and street men, who work in connection with the distributing branch of the business, and who usually form a larger proportion of the total number of wage earners than the gas makers.

The establishments very naturally in most cases reported the prevailing working time of the gas makers—which is usually 72 hours or more per week—as the prevailing time for the establishment, and statistics classifying the total number of wage earners according to the "prevailing" working time reported doubtless exaggerate the actual number of wage earners for whom these were the prevailing hours.

In the United States as a whole there were 474 wage earners employed in establishments which reported 48 hours or less as the "prevailing" working time, 21 in establishments which reported more than 48 but less than 54; 1,049 in establishments which reported 54; 2,716 in establishments which reported more than 54 but less than 60; 5,806 in establishments which reported 60; 5,786 in establishments which reported more than 60 but less than 72; and 21,363 in establishments which reported 72 hours or more per week.

Character of ownership.—Table 7 presents data with respect to the character of ownership of the establishments in the gas industry for 1909 and 1904.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	1,286	1,019	\$166,814,371	\$125,144,845
Individual.....	48	24	114,851	134,713
Firm.....	27	17	108,123	66,927
Corporation.....	1,091	931	165,108,539	123,788,392
Other.....	130	47	1,482,858	1,154,913
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	3.7	2.4	0.1	0.1
Firm.....	2.1	1.7	0.1	0.1
Corporation.....	84.2	91.4	99.0	98.9
Other.....	10.0	4.6	0.9	0.9

The most important distinction shown is that between corporate and all other forms of ownership. In 1909, of the total number of establishments reported for the industry, 84.2 per cent were under corporate

ownership, as compared with 91.4 per cent in 1904. In 1909 these establishments reported 99 per cent of the entire value of products reported. In this industry municipal operation is of greater importance than in any other branch of manufactures. The 130 establishments reported for "other" forms of ownership reported products valued at \$1,482,858. These were practically all municipally owned gas works. The large gas works of Philadelphia, although owned by the city, are operated by a private corporation, and have been classed with corporate enterprises in the table.

Table 8 gives statistics concerning the number of establishments operated under the different forms of ownership, by states. It will be noted that, except for Minnesota, where gas works operated by municipalities outnumbered all others, corporate ownership predominates over all other forms. There were eleven establishments reported under "all other" forms of ownership, eight of which were cooperative associations.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—				
	Individuals.	Firms.	Corporations.	Municipalities.	All others.
United States	48	27	1,091	118	11
Alabama.....		1	10	2	
Arizona.....			8		
Arkansas.....			5		
California.....	1		72	1	
Colorado.....			10		
Connecticut.....			27	1	
Delaware.....	1		4		
District of Columbia.....			3		
Florida.....			11	1	
Georgia.....			12	3	
Idaho.....			3		
Illinois.....	2		73	3	
Indiana.....	1	2	48	1	1
Iowa.....	4	7	71	35	
Kansas.....	2	2	7	1	
Kentucky.....			15		
Louisiana.....			5		
Maine.....	2		16		1
Maryland.....	2	1	15		
Massachusetts.....	1	1	57	4	1
Michigan.....		1	53	1	
Minnesota.....	1		15	26	
Mississippi.....			8		
Missouri.....	1	3	23	1	1
Montana.....			5		
Nebraska.....	12	2	23	7	4
Nevada.....			3		
New Hampshire.....		1	13		
New Jersey.....			45	1	1
New Mexico.....			2		
New York.....	8	2	128	3	
North Carolina.....			14		
North Dakota.....	1		4	1	
Ohio.....	2		36		
Oklahoma.....	1		5		
Oregon.....			8		
Pennsylvania.....	1	3	95		
Rhode Island.....			8		
South Carolina.....	1		7	4	
South Dakota.....			13	4	
Tennessee.....		1	10		
Texas.....	3		24		
Utah.....			3		
Vermont.....			9		
Virginia.....	1		14	6	
Washington.....			12		
West Virginia.....			3	1	
Wisconsin.....			35	12	2
Wyoming.....			1		

Establishments classified according to size.—Table 9 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

Gas manufacture is distinctly an urban industry with a purely local market for its product. Therefore the size of the establishment is largely governed by the population of the community in which it is located. The greater part of the value of products of the industry

was reported for establishments having products valued at \$100,000 or more. The value of products for these establishments in 1909 formed 86.8 per cent of the total, as compared with 85.1 per cent in 1904. The 28 establishments having products valued at \$1,000,000 or more reported 57.8 per cent of the total value of products in 1909.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	1,296	1,019	\$166,814,371	\$125,144,945
Less than \$5,000.....	356	193	764,347	503,016
\$5,000 and less than \$20,000.....	371	362	4,445,249	4,034,009
\$20,000 and less than \$100,000.....	369	316	16,863,851	14,087,898
\$100,000 and less than \$1,000,000.....	172	124	48,345,467	32,561,811
\$1,000,000 and over.....	28	24	96,395,457	73,895,211
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	27.5	18.9	0.5	0.4
\$5,000 and less than \$20,000.....	28.6	35.5	2.7	3.3
\$20,000 and less than \$100,000.....	28.5	31.0	10.1	11.3
\$100,000 and less than \$1,000,000.....	13.3	12.2	29.0	26.0
\$1,000,000 and over.....	2.2	2.4	57.8	59.0

A considerable increase in the number of small establishments—those with products valued at less than \$5,000—occurred between 1904 and 1909, which is accounted for in large part by an increase in the number of small acetylene gas plants.

There was a small decrease, from 30 in 1904 to 28.7 in 1909, in the average number of wage earners per establishment, but the average value of products per establishment increased from \$122,812 in 1904 to \$128,715 in 1909, and the average value added by manufacture from \$86,325 to \$88,261.

In some respects, and especially from the standpoint of conditions under which persons who are engaged in manufacturing work, the best classification of establishments to bring out the feature of size is a classification according to the number of wage earners employed. Table 10 gives such a classification of the gas manufacturing establishments in the leading states.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
	Estab-lish-ments.	Wage earners (average number)	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.....	1,296	37,216	108	631	1,525	308	3,286	110	3,521	70	4,856	45	7,105	13	4,424	7	4,138	4	8,310
California.....	74	1,666	.....	38	106	27	299	3	87	3	252	1	171	2	751	.....	.....	.....	.....
Connecticut.....	28	926	.....	8	17	10	116	3	72	5	287	1	105	1	329	.....	.....	.....	.....
Illinois.....	78	6,301	.....	34	81	20	214	9	272	10	727	4	537	.....	.....	.....	.....	1	4,470
Indiana.....	53	928	.....	29	85	13	144	6	198	4	293	1	208	.....	.....	.....	.....	.....	.....
Iowa.....	117	806	22	74	107	10	97	7	234	3	228	1	140	.....	.....	.....	.....	.....	.....
Massachusetts.....	64	2,292	2	21	49	18	200	7	200	8	525	7	1,048	1	270	.....	.....	.....	.....
Michigan.....	55	1,771	.....	17	61	22	243	9	330	5	388	1	235	.....	.....	1	514	.....	.....
Minnesota.....	42	848	3	33	53	4	54	.....	.....	.....	.....	1	235	.....	.....	.....	.....	.....	.....
Missouri.....	29	941	3	19	47	5	62	1	50	.....	.....	.....	.....	.....	.....	1	782	.....	.....
New Jersey.....	47	1,917	.....	23	69	17	175	2	81	.....	.....	3	492	1	484	.....	.....	.....	.....
New York.....	141	6,422	27	56	150	27	285	12	383	5	313	8	1,145	4	1,367	.....	.....	2	2,779
Ohio.....	38	666	2	22	61	9	98	1	24	1	54	3	429	.....	.....	.....	.....	.....	.....
Pennsylvania.....	99	3,119	7	50	124	22	238	12	455	4	243	2	310	.....	.....	1	688	1	1,061
Texas.....	27	575	3	9	32	7	67	4	115	3	206	1	155	.....	.....	.....	.....	.....	.....
Wisconsin.....	49	1,063	.....	27	48	13	159	5	141	.....	.....	.....	.....	.....	.....	1	524	.....	.....

The gas industry is characterized by the relatively small number of wage earners required to carry on the business, particularly the manufacturing process. Of the 1,296 establishments reported, 8.3 per cent employed no wage earners, 48.7 per cent employed only from 1 to 5 wage earners, and 23.8 per cent from 6 to 20. On the other hand, establishments employing 21 wage earners and over, of which there were only 249, reported a total of 32,404 wage earners, or 87.1 per cent of the total number. There were only 4 establishments reporting over 1,000 wage earners each, but these establishments reported 22.3 per cent of the total number of wage earners.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of depreciation, and for other reasons, and consequently they can not properly be used for determining profits. Facts of interest can be brought out, however, con-

cerning the relative importance of the different classes of expenses which were reported. Table 11 shows in percentages, for 1909, the distribution of these expenses in the leading states.

STATE.	PER CENT OF TOTAL EXPENSES REPORTED: 1909			
	Salaries.	Wages.	Materials.	Miscellaneous expenses.
United States.....	10.9	18.4	46.2	24.5
California.....	12.6	21.6	39.9	26.0
Connecticut.....	12.5	24.3	43.7	19.6
Illinois.....	11.2	21.3	44.6	22.9
Indiana.....	15.4	22.0	47.6	15.0
Iowa.....	11.2	18.6	54.5	15.8
Maryland.....	17.7	14.6	41.6	26.2
Massachusetts.....	7.5	17.7	54.0	20.8
Michigan.....	12.1	24.5	47.6	15.8
Minnesota.....	9.7	16.6	46.7	26.9
Missouri.....	12.1	21.5	41.3	25.2
New Jersey.....	6.9	9.4	31.4	52.3
New York.....	10.4	15.2	52.4	22.0
Ohio.....	8.3	19.8	37.9	34.1
Pennsylvania.....	13.5	16.3	44.6	25.6
Wisconsin.....	10.8	22.1	52.5	14.6

In the United States as a whole 46.2 per cent of the total expenses reported for the gas industry were incurred for materials, 18.4 per cent for wages, 10.9 per cent for salaries, and 24.5 per cent for other purposes. For all industries combined the corresponding proportions were 65.8, 18.6, 5.1, and 10.5 per cent, respectively.

As a general rule, in those states where the proportion shown for the cost of materials is highest, the prices of coal and other fuel used as material are high; on the other hand, in states with a plentiful supply of suitable fuel, the proportion for materials is relatively low. The extremely high percentage of the total expenses shown for miscellaneous expenses in New Jersey, 52.3, was due chiefly to peculiar conditions; most of the miscellaneous expenses reported were designated as for "rent of factory" (see Table 22), an item which usually does not appear at all in the returns. The proportion reported for wages is low in certain states where a good deal of the distributing branch of the business is conducted by separate concerns not covered by the census, or where, on the other hand, the gas manufacturing establishments themselves buy part of their gas from other concerns, especially coke manufacturers. A more detailed analysis of the statistics of expenses is possible from Table 22, which gives the figures in detail for all the states.

Engines and power.—The amount of power used in the industry was first reported at the census of 1869. Table 1, which gives data for the gas manufacturing industry as a whole, shows that the total horsepower used increased from 2,768 in 1869 to 128,350 in 1909. Table 12 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current), and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows

separately the number and horsepower of electric motors, including those operated by current generated in the establishment.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	3,521	2,368	1,831	128,350	73,101	31,797	100.0	100.0	100.0
Owned.....	3,285	2,307	1,631	125,456	71,222	31,725	97.7	97.4	99.8
Steam.....	2,969	2,142	1,609	116,332	67,482	31,165	89.9	92.3	98.0
Gas.....	281	146	18	7,128	3,211	250	5.6	4.4	0.8
Water wheels.....	20	8	4	2,755	339	33	2.1	0.5	0.1
Water motors.....	15	11	.....	69	20	.....	(¹)	(²)	.....
Other.....	.....	.....	.....	182	170	277	0.1	0.2	0.9
Rented.....	236	59	(²)	2,894	1,879	72	2.3	2.6	0.2
Electric.....	236	59	(²)	2,723	1,454	52	2.1	2.0	0.2
Other.....	.....	.....	.....	171	425	20	0.1	0.6	0.1
Electric motors.....	935	232	40	17,338	3,878	271	100.0	100.0	100.0
Run by current generated by establishment.....	699	173	40	14,613	2,524	219	84.3	63.4	80.8
Run by rented power.....	236	59	(²)	2,723	1,454	52	15.7	36.6	19.2

¹ Less than one-tenth of 1 per cent.

² Not reported.

The total primary power used in gas manufacturing establishments increased from 31,797 horsepower in 1899 to 128,350 horsepower in 1909, or 303.7 per cent. The power of gas and other internal-combustion engines, that of water wheels, and rented electric power increased many fold during the decade, so that steam power formed a smaller proportion of the total in 1909 than in 1899—89.9 per cent, as compared with 98 per cent. The horsepower of electric motors operated by current generated in the establishment reporting also increased enormously, from only 219 in 1899 to 14,613 in 1909.

Table 13 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in the 15 leading states.

STATE.	PRIMARY HORSEPOWER.								ELECTRIC HORSEPOWER.		FUEL USED.						
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.					
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
United States..	873	128,350	125,456	115,332	7,128	2,814	182	2,723	171	17,338	14,613	898,994	4,668,096	759,245	3,722	11,816,232	605,408
California.....	61	7,502	7,084	6,542	539	3	.....	418	.....	6,537	6,119	.....	300	.....	9	2,205,961	600
Connecticut.....	22	4,100	3,995	3,383	12	600	.....	105	.....	1,064	959	33,925	89,977	5,691	7	192,670	1,419
Illinois.....	64	18,385	18,116	17,359	767	.....	.....	257	12	330	73	5,551	437,127	253,479	.....	1,520,486	200
Indiana.....	41	5,845	5,815	5,767	44	.....	4	6	25	252	247	2,478	180,994	26,750	.....	140,915	13,645
Iowa.....	97	2,043	2,026	1,453	630	42	1	17	.....	84	67	216	94,175	24,234	.....	138,484	2
Massachusetts.....	42	7,371	7,075	7,051	9	15	.....	37	49	1,193	946	109,399	290,835	58,940	3	484,513	.....
Michigan.....	45	6,035	6,018	5,506	512	.....	.....	247	.....	56	19	2,423	426,703	3,192	.....	111,857	.....
Minnesota.....	33	3,538	3,530	1,117	904	1,509	.....	8	.....	314	306	44	97,088	1,266	200	190,502	5,188
Missouri.....	15	3,635	3,595	2,917	678	.....	.....	40	.....	40	.....	3,147	220,558	3,568	.....	283,744	60
New Jersey.....	40	6,717	6,694	6,364	250	.....	80	23	.....	61	28	72,990	179,915	3,428	4	628,280	.....
New York.....	91	30,089	29,497	28,748	99	618	2	588	34	4,567	3,979	485,900	832,970	119,602	120	3,430,773	.....
Ohio.....	28	2,165	2,155	2,118	42	.....	.....	10	.....	10	.....	1,290	311,070	4,313	6	54,127	223,175
Pennsylvania.....	76	9,374	9,238	8,365	871	2	.....	136	.....	469	333	99,297	348,241	79,675	4	948,620	44,268
Texas.....	23	1,090	1,077	1,067	10	.....	.....	2	11	27	25	7,930	31,985	7,322	6	99,624	241,102
Wisconsin.....	44	3,278	3,125	1,659	1,441	25	.....	153	.....	981	828	496	189,477	26,963	64	36,856	17,190
All other states.....	251	17,163	16,446	16,921	430	.....	95	677	40	1,361	684	73,898	936,681	140,322	3,299	1,348,870	58,559

The states which ranked highest with respect to amount of power used in 1909 were New York, Illinois, Pennsylvania, California, Massachusetts, New Jersey, Michigan, and Indiana. The total horsepower reported for these states in 1909 was 91,338, or 71.2 per cent of the aggregate for the United States. Steam was the most important power in all of the states shown separately, with the exception of Minnesota, where water power was the most important. Of the power of gas and other internal-combustion engines, the greatest amount, 1,441 horsepower, was reported for Wisconsin. The greatest amount of water power, 1,509 horsepower, or 53.6 per cent of the total for the country, was reported for Minnesota.

Fuel consumed.—The statistics relating to fuel, shown in Table 13, include fuel used for all purposes, both as material for gas making and for boilers and retorts, but the figures for fuel used as material in the gas

making process, which represents by far the greater part of the fuel used in the industry, are shown separately in Table 14. Owing to the lack of an exact standard of comparison between fuels of different kinds, it is difficult to determine with accuracy the comparative importance of the different states from the standpoint of the total consumption of fuel in the manufacture of gas. New York is first in importance undoubtedly, as it leads the other states in the use of anthracite coal, of bituminous coal, and of oil, and is second only to Illinois in the quantity of coke used. Illinois and Pennsylvania report about equal quantities of coal—anthracite and bituminous together—but Illinois uses considerably more coke and oil than Pennsylvania. In California the scarcity of coal suitable for gas making and the large supply of oil are indicated by the fact that oil is practically the only fuel used in the industry.

SPECIAL STATISTICS OF MATERIALS, PRODUCTS, ETC.

The United States as a whole.—The special schedule used in collecting the statistics for the gas industry required a detailed statement of the quantity and cost of the different kinds of fuel used as material, and of the quantity and value of the different products manufactured. Table 14 shows the statistics for the United States for 1909, 1904, and 1899.

	1909	1904	1899
MATERIALS.			
Total cost	\$52,427,844	\$37,130,066	\$20,805,356
Coal used for gas making:			
Tons.....	4,940,598	4,431,774	2,487,287
Cost.....	\$16,304,832	\$14,607,485	\$7,164,472
Average cost per ton.....	\$3.30	\$3.30	\$2.88
Oil used for gas making: ¹			
Gallons.....	579,657,152	410,989,564	194,887,296
Cost.....	\$17,245,750	\$16,015,602	\$8,168,657
Average cost per gallon.....	0.03	\$0.04	\$0.04
Coke used for gas making:			
Tons.....	591,919	435,534	217,354
Cost.....	\$2,667,706	\$1,602,762	\$726,736
Average cost per ton.....	\$4.51	\$3.68	\$3.34
Gas purchased:			
Cubic feet (thousands).....	18,769,705	2,696,571	(³)
Cost.....	\$5,416,601	\$937,252	(³)
Average cost per thousand cubic feet.....	\$0.32	\$0.35	.....
Fuel for boilers and retorts.....	\$2,369,131	\$2,298,168	\$1,082,844
All other materials.....	\$8,323,824	\$2,718,797	\$3,462,647
PRODUCTS.			
Total value	\$166,814,371	\$125,144,945	\$75,718,683
Gas:			
Cubic feet (thousands).....	160,835,793	112,549,979	67,093,553
Value.....	\$138,615,309	\$112,662,568	\$69,432,582
Average value per thousand cubic feet.....	\$0.92	\$1.00	\$1.03
Straight coal—			
Cubic feet (thousands).....	19,985,253	12,693,034	(³)
Value.....	\$18,065,841	\$12,868,604	(³)
Average value per thousand cubic feet.....	\$0.90	\$1.01	.....
Straight water—			
Cubic feet (thousands).....	1,726,082	715,550	(³)
Value.....	\$1,289,031	\$832,440	(³)
Average value per thousand cubic feet.....	\$0.75	\$1.16	.....
Carbureted water—			
Cubic feet (thousands).....	79,418,486	54,687,418	(³)
Value.....	\$69,513,749	\$48,071,180	(³)
Average value per thousand cubic feet.....	\$0.88	\$0.88	.....
Mixed coal and water—			
Cubic feet (thousands).....	40,776,283	40,980,414	(³)
Value.....	\$36,953,543	\$45,605,263	(³)
Average value per thousand cubic feet.....	\$0.91	\$1.11	.....

	1909	1904	1899
Table 14—Continued.			
PRODUCTS—continued.			
Gas—Continued.			
Oil—			
Cubic feet (thousands).....	8,688,860	3,441,352	(³)
Value.....	\$12,111,458	\$5,141,460	(³)
Average value per thousand cubic feet.....	\$1.39	\$1.49	.....
Acetylene—			
Cubic feet (thousands).....	25,186	7,881	(³)
Value.....	\$361,348	\$104,267	(³)
Average value per thousand cubic feet.....	\$14.35	\$13.23	.....
All other—			
Cubic feet (thousands).....	216,643	24,330	(³)
Value.....	\$320,339	\$39,354	(³)
Average value per thousand cubic feet.....	\$1.48	\$1.62	.....
Coke (for sale):			
Bushels.....	82,049,683	89,146,434	.....
Value.....	\$5,723,215	\$5,195,461	.....
Average value per bushel.....	\$0.07	\$0.06	.....
Tar (for sale):			
Gallons.....	78,339,880	67,515,421	\$4,283,204
Value.....	\$1,876,549	\$2,064,343	.....
Average value per gallon.....	\$0.02	\$0.03	.....
All other products			
Receipts from rents and sales of lamps and appliances.....	\$7,043,390	\$4,249,581	\$2,000,907

¹ Does not include \$4,013,885 paid for lamps and appliances.
² Includes for 1909, 253,837 gallons of benzol, costing \$27,543.
³ Comparable figures not available.
⁴ In addition, products of gas manufacture to the value of \$261,802 were produced commercially by establishments engaged primarily in the manufacture of products other than those covered by the industry designation. These products were 27,558,000 cubic feet of coal gas, valued at \$29,419; 13,070,000 cubic feet of acetylene gas, valued at \$224,618; 44,347 bushels of coke, valued at \$3,399; 38,370 gallons of tar, valued at \$1,372; and receipts from the sale of lamps and appliances to the amount of \$2,994.
⁵ In addition, 13,813,058 gallons were produced for which no value was reported.
⁶ Includes 37,277,864 gallons of ammonia liquor, valued at \$725,702, and 1,054,220 pounds of hydrocarbons, valued at \$44,509. In addition, 12,442,356 gallons of ammonia liquor and 100,099 pounds of hydrocarbons were produced for which no value was reported.

The statistics for the gas industry presented in Table 14 cover only those establishments which made gas as their main product. The coal, oil, and coke reported in this table represent only those materials used in gas making, and do not include those used for power purposes or for heating retorts, the cost of which is shown separately. The ton of 2,000 pounds is used for showing quantities of coal and coke used.

The cost of materials aggregated \$52,427,844 in 1909, as compared with \$20,605,356 in 1899, an in-

crease of 154.4 per cent. Oil is, and has been for several censuses, the principal material used in respect to value, with coal second in importance.

The value of products aggregated \$166,814,371 in 1909, as compared with \$75,716,693 in 1899, an increase of 120.3 per cent. About three-fourths of this increase represents that in the value of the gas itself.

The amount of gas produced was 150,835,793,000 cubic feet in 1909, as compared with 67,093,553,000 in 1899, an increase of 124.8 per cent. Carbureted water gas is the kind most largely manufactured; it increased from 54,687,418,000 cubic feet in 1904 to 79,418,486,000 in 1909, a gain of 45.2 per cent. In 1909 it constituted 52.7 per cent of the total production; in 1904, 48.6 per cent. Mixed coal and water gas was the next in importance, with 40,775,283,000 cubic feet in 1909, as compared with 40,980,414,000 in 1904, a decrease of one-half of 1 per cent. Straight coal gas increased from 12,693,034,000 cubic feet in 1904 to 19,985,253,000 in 1909, a gain of 57.5 per cent.

The greatest percentages of increase in quantity are for acetylene gas, oil gas, and straight water gas, in the order named, although the quantities of each of these kinds are still comparatively small. Acetylene gas increased 219.6 per cent from 1904 to 1909; oil gas, 152.5 per cent; and straight water gas, 141.2 per cent.

There was a decrease of 8 per cent in the production of coke for sale between 1904 and 1909, but the production of tar for sale increased 16 per cent. These figures do not include coke and tar made and consumed in the same establishment.

In addition to the products of establishments classified as engaged in the gas industry, certain establishments engaged primarily in the manufacture of other products did some commercial gas business in 1909. If their output be added (but without including the output of coke ovens), the figures for straight coal gas become 20,012,811,000 cubic feet, valued at \$18,095,260; for acetylene gas, 38,256,000 cubic feet, valued at \$585,966; for coke, 82,094,030 bushels, valued at \$5,726,614; and for tar, 78,378,250 gallons, valued at \$1,876,921. The large production of gas by establishments in other industries which consume the product themselves is not here included.

Statistics of the gas made in coke establishments are shown in detail in the special report on "Coke," as follows:

Table 15	1909	1904
By-products obtained from retort or by-product coke ovens—		
Gas made, cubic feet (thousands).....	76,590,763	18,761,101
Used in process or wasted, cubic feet (thousands)	60,799,543	14,878,301
Sold—		
Cubic feet (thousands).....	15,791,220	3,882,800
Value.....	\$2,609,211	\$684,464

The following products were made in establishments in the gas industry proper and consumed by them in

their own operations. These products are not included in Table 14.

Table 16	1909	1904
Coke.....bushels..	49,550,153	46,561,185
Tar.....gallons..	31,590,178	14,772,878
Gas.....cubic feet...(thousands)..	1,730,563	1,363,757
Benzene and benzol.....gallons..	302,994	.....

Table 14 also shows, for each census, the average cost of each of the four classes of materials specified and the average value of each of the different kinds of gas and other products.

There was some increase between 1899 and 1909 in the average cost per ton of coal used for gas making, but this is possibly attributable in part to the erection of new gas plants at points distant from the coal producing regions. The average value of oil consumed by gas works was the same in 1899 and 1904, but declined slightly between 1904 and 1909, this decrease doubtless being due partly to the greatly increased production of crude oil in the United States and to the use for gas purposes of large quantities of oil derived from the cheap new crude oils of Oklahoma, Texas, California, and other states. Nearly three-tenths of the oil used for gas making in the United States in 1909 was used in New York and more than one-sixth was used in California.

In the United States as a whole there was in 1909 no very great difference in the average value per thousand cubic feet of straight coal gas, carbureted water gas, and mixed coal and water gas, the three most important classes. The average value of straight water gas, however, was materially lower than that for the other four classes, while, on the other hand, the average value of oil gas, which is a comparatively important class, was materially higher, and that of acetylene gas, much higher.

For the United States as a whole the average value per thousand cubic feet of all gas made by establishments in the gas industry was \$1.03 in 1899, \$1 in 1904, and \$0.92 in 1909. This decrease in average value can not be attributed to changes in the relative importance of different classes of gas. On the contrary, the production of oil gas and acetylene gas, which are more valuable than the other kinds, though still comparatively small, has increased more rapidly than the production of the other varieties. On the other hand, it does not necessarily follow from this decrease in average value that there has been a general reduction in the rates charged to consumers. In many cases gas companies charge a lower rate for gas used for cooking, heating, or power than for that used for lighting. If, under such circumstances, in the case of a given company the consumption of gas for heating, cooking, and power should increase more rapidly than the consumption for lighting, there might be a reduction in the average price or value of all gas made by the company without any change whatever in rates. There are wide varia-

Marked differences appear among the states with respect to the relative importance of coal and oil, respectively, as materials for gas making. Thus in Illinois the amount spent for oil was slightly less than that spent for coal and coke combined, in Pennsylvania it was only slightly greater, and in New York it was considerably greater, while in California there was virtually no expenditure for coal and coke for gas making. On the other hand, in Massachusetts the expenditure for coal and coke was more than double that for oil, and in Michigan it was over six times as great.

Table 18 shows the quantity and value of all gas and of the different kinds of gas manufactured in 1909, by states, and also the quantity and value of coke, tar, and other by-products manufactured for sale as such (not including such products manufactured for consumption in the same establishment), together with the amounts received from rents and sales of lamps and appliances.

The ranking of the leading states with respect to the production of gas of all kinds combined is, in general,

approximately the same as the ranking with respect to value of products of the gas industry, as shown in Table 2. In New York in 1909 the production amounted to 45,768,354,000 cubic feet, or 30.3 per cent of the total for the United States. The production in Illinois constituted 12.7 per cent of the total and that in Pennsylvania 9.4 per cent, while no other state contributed as much as one-fifteenth of the total output.

Marked differences appear among the states with respect to the relative importance of the different kinds of gas made. For example, in New York about three-fourths of all the gas made in 1909 was carbureted water gas, while in New Jersey only about one-sixth was of that class, and in California almost nine-tenths of the total was oil gas.

The states have quite a different rank with respect to the production of coke for sale from that which they occupy with respect to the production of gas. This is due to the differences among the states with respect to the kind of gas made.

GAS, ILLUMINATING AND HEATING—PRODUCTS, BY STATES: 1909.

Table 18			Table 18		
PRODUCT AND STATE.	Quantity.	Value.	PRODUCT AND STATE.	Quantity.	Value.
	1,000 cubic feet.			1,000 cubic feet.	
Gas, total.....	150,835,783	\$138,615,309	Straight coal gas—Continued.		
Alabama.....	463,031	509,777	Virginia.....	305,253	\$352,159
Arizona.....	93,179	133,845	Wisconsin.....	1,559,326	1,375,043
Arkansas.....	162,552	179,366	All other states.....	1,787,502	2,200,453
California.....	8,094,478	8,721,212	Straight water gas.....	1,728,082	1,289,031
Colorado.....	1,330,270	1,205,842	Illinois.....	452,982	193,458
Connecticut.....	3,168,309	3,125,898	Iowa.....	110,311	99,683
Delaware.....	296,495	328,535	Minnesota.....	803,854	723,836
Florida.....	324,382	497,487	Missouri.....	45,287	45,287
Georgia.....	1,152,037	1,292,439	All other states.....	313,648	226,817
Illinois.....	19,201,660	16,836,776	Carbureted water gas.....	79,418,486	69,513,749
Indiana.....	3,063,449	2,582,773	California.....	1,050,302	760,352
Iowa.....	2,284,423	2,476,463	Connecticut.....	2,175,286	2,137,581
Kansas.....	48,474	201,448	Illinois.....	15,460,046	13,109,036
Kentucky.....	1,043,986	800,549	Iowa.....	1,251,707	1,292,437
Louisiana.....	787,837	1,002,831	Louisiana.....	752,686	881,625
Maine.....	345,445	437,776	Maryland.....	2,120,168	2,878,773
Maryland.....	2,204,785	3,002,053	Massachusetts.....	3,756,702	3,015,064
Massachusetts.....	9,316,558	8,259,244	Nebraska.....	976,046	1,159,758
Michigan.....	4,361,946	4,525,653	New Jersey.....	1,268,266	1,149,698
Minnesota.....	2,985,239	2,668,938	New York.....	34,759,676	26,704,625
Mississippi.....	154,041	183,305	Pennsylvania.....	11,239,646	11,430,176
Missouri.....	4,603,225	4,277,271	All other states.....	4,609,973	4,994,624
Montana.....	84,032	139,195	Mixed coal and water gas.....	40,775,283	38,953,543
Nebraska.....	1,042,263	1,279,054	Colorado.....	1,284,815	1,062,216
Nevada.....	35,115	67,263	Connecticut.....	483,589	477,125
New Hampshire.....	404,958	504,374	Georgia.....	830,203	697,227
New Jersey.....	7,507,053	7,852,422	Illinois.....	2,170,685	1,996,149
New York.....	45,768,354	34,851,565	Indiana.....	1,986,189	1,545,258
North Carolina.....	222,955	330,558	Iowa.....	476,184	491,263
North Dakota.....	102,840	164,263	Kentucky.....	487,956	426,810
Ohio.....	3,100,638	2,401,451	Massachusetts.....	4,175,576	3,634,267
Oklahoma.....	89,237	106,785	Michigan.....	2,455,033	2,534,314
Oregon.....	865,528	887,806	Minnesota.....	1,732,159	1,455,275
Pennsylvania.....	14,204,588	14,608,134	Missouri.....	4,232,490	3,674,190
Rhode Island.....	1,806,830	1,697,254	New Jersey.....	5,911,754	6,174,969
South Carolina.....	207,067	292,914	New York.....	4,603,866	3,490,211
South Dakota.....	162,451	236,067	Ohio.....	1,690,784	1,204,911
Tennessee.....	1,049,074	1,074,972	Pennsylvania.....	813,647	739,931
Texas.....	1,097,115	1,442,119	Rhode Island.....	1,388,286	1,230,621
Vermont.....	184,364	238,361	Texas.....	375,479	454,395
Virginia.....	1,262,806	1,291,055	Virginia.....	902,865	827,161
Washington.....	1,153,492	1,315,082	Washington.....	1,017,591	1,154,787
West Virginia.....	181,439	186,153	All other states.....	3,726,132	3,502,463
Wisconsin.....	2,082,344	1,958,197	Oil gas.....	8,888,860	12,111,458
All other states.....	2,732,840	2,540,724	Arizona.....	93,179	133,845
Straight coal gas.....	19,985,253	\$18,085,841	California.....	6,732,394	7,700,007
Connecticut.....	491,170	467,538	Illinois.....	79,973	374,332
Illinois.....	1,026,142	1,134,545	Massachusetts.....	62,068	133,639
Indiana.....	404,088	442,601	Missouri.....	49,298	215,570
Iowa.....	336,361	356,510	New Jersey.....	82,804	210,661
Kentucky.....	402,282	258,566	New York.....	134,167	322,878
Massachusetts.....	1,320,895	1,456,114	Ohio.....	49,906	238,905
Michigan.....	1,646,759	1,654,190	Oregon.....	843,728	849,885
Minnesota.....	360,977	363,379	Pennsylvania.....	76,756	301,769
Missouri.....	214,844	262,720	Tennessee.....	29,052	123,707
New Jersey.....	244,947	297,357	Texas.....	66,001	186,605
New York.....	6,258,297	4,267,355	All other states.....	389,534	1,309,585
Ohio.....	1,232,399	825,561			
Pennsylvania.....	2,073,819	2,025,189			
Tennessee.....	320,194	326,561			

GAS, ILLUMINATING AND HEATING—PRODUCTS, BY STATES: 1909—Continued.

Table 18— Cont.		Quantity.	Value.	PRODUCT AND STATE.	Quantity.	Value.
		<i>1,000 cubic feet.</i>			<i>1,000 cubic feet.</i>	
Acetylene gas	25,186	\$361,348	Ammonia liquors (16-ounce basis)	² 49,720,220	\$725,702	
Connecticut.....	1,056	16,409	Colorado.....	1,508,004	12,295	
Illinois.....	925	13,051	Connecticut.....	473,977	15,226	
Indiana.....	571	7,803	Georgia.....	602,438	11,207	
Iowa.....	1,261	15,616	Illinois.....	3,047,713	38,194	
Kansas.....	723	9,779	Indiana.....	1,721,038	18,114	
Maine.....	616	11,274	Kentucky.....	650,645	17,002	
Maryland.....	430	6,455	Massachusetts.....	4,731,440	56,067	
Massachusetts.....	1,317	20,160	Michigan.....	4,431,752	85,936	
Minnesota.....	1,029	10,108	Minnesota.....	1,320,146	12,123	
Missouri.....	354	5,564	Missouri.....	5,699,177	52,583	
Nebraska.....	1,722	25,370	New Jersey.....	1,078,478	14,310	
New Jersey.....	1,282	19,717	New York.....	8,273,880	184,692	
New York.....	3,488	48,837	Ohio.....	4,565,012	69,607	
Ohio.....	570	19,060	Pennsylvania.....	2,666,176	55,087	
Pennsylvania.....	720	11,069	Rhode Island.....	1,393,920	6,745	
South Carolina.....	559	8,520	Tennessee.....	581,875	9,180	
Texas.....	246	4,274	Virginia.....	815,922	4,617	
Wisconsin.....	363	4,063	Wisconsin.....	1,062,583	35,481	
All other states.....	7,954	104,219	All other states.....	5,096,039	27,236	
All other gas	218,843	320,339	Hydrocarbons	³ 1,154,319	44,509	
Illinois.....	10,907	16,155	California.....	38,506	1,568	
Iowa.....	86,002	190,785	Connecticut.....	10,207	1,132	
Minnesota.....	34,843	48,304	Illinois.....	129,240	7,908	
Nebraska.....	22,830	33,791	Iowa.....	15,749	964	
New York.....	8,860	17,659	Massachusetts.....	93,021	3,464	
South Dakota.....	6,618	10,456	Missouri.....	68,917	3,176	
Texas.....	3,840	4,800	Montana.....	12,462	1,959	
Virginia.....	3,503	5,543	New Jersey.....	82,177	3,259	
Wisconsin.....	33,254	42,770	New York.....	318,312	7,436	
All other states.....	5,986	10,076	Ohio.....	77,102	2,812	
Coke (for sale)	<i>Bushels.</i>		Pennsylvania.....	79,112	4,578	
Alabama.....	82,049,683	5,723,215	Tennessee.....	34,272	1,361	
Colorado.....	1,086,810	67,213	Texas.....	24,025	828	
Connecticut.....	1,999,602	72,730	All other states.....	171,217	4,064	
Georgia.....	1,289,912	91,123	Receipts from rents and sales of lamps and appli-			
Illinois.....	1,085,075	59,096	ances		7,043,390	
Indiana.....	6,255,414	461,518	Alabama.....		92,843	
Iowa.....	2,987,709	181,563	Arkansas.....		33,344	
Kentucky.....	1,196,762	112,715	California.....		103,007	
Massachusetts.....	1,867,447	125,782	Colorado.....		160,521	
Michigan.....	7,888,201	545,719	Connecticut.....		173,959	
Minnesota.....	7,443,914	528,047	Delaware.....		31,502	
Missouri.....	1,375,257	127,572	Florida.....		80,558	
Missouri.....	2,041,075	129,903	Georgia.....		39,341	
New York.....	17,509,868	1,163,509	Illinois.....		1,310,526	
Ohio.....	7,688,438	387,780	Indiana.....		299,484	
Pennsylvania.....	6,187,851	603,116	Iowa.....		262,575	
Rhode Island.....	847,859	77,916	Kentucky.....		32,546	
Tennessee.....	1,021,867	34,103	Louisiana.....		69,193	
Virginia.....	1,217,684	91,442	Maine.....		62,448	
Washington.....	831,179	67,968	Maryland.....		135,594	
Wisconsin.....	3,932,758	297,424	Massachusetts.....		273,152	
All other states.....	6,295,021	496,976	Michigan.....		501,477	
Tar	<i>Gallons.</i>		Mississippi.....		52,173	
Colorado.....	192,182,938	1,875,549	Missouri.....		85,822	
Connecticut.....	662,859	21,051	Nebraska.....		107,082	
Georgia.....	1,489,298	36,859	New Hampshire.....		25,148	
Illinois.....	943,925	22,239	New Jersey.....		455,963	
Indiana.....	14,394,777	232,557	New York.....		1,033,926	
Iowa.....	2,005,219	53,620	Ohio.....		81,971	
Kentucky.....	1,311,971	28,197	Pennsylvania.....		408,551	
Maryland.....	1,101,923	27,695	Rhode Island.....		35,598	
Massachusetts.....	1,139,874	25,002	South Dakota.....		40,159	
Michigan.....	5,756,264	152,908	Tennessee.....		137,532	
Michigan.....	4,857,126	113,477	Texas.....		129,874	
Minnesota.....	2,428,999	49,461	Vermont.....		27,750	
Missouri.....	4,021,339	88,499	Virginia.....		61,402	
New Jersey.....	1,808,414	39,741	Washington.....		222,427	
New York.....	21,744,268	312,749	Wisconsin.....		297,517	
Ohio.....	4,105,981	110,224	All other states.....		183,434	
Pennsylvania.....	8,216,207	217,747				
Tennessee.....	897,654	24,419				
Virginia.....	922,975	22,923				
Washington.....	1,356,631	64,345				
Wisconsin.....	2,243,196	57,390				
All other states.....	10,744,033	174,446				

¹ Includes 13,813,058 gallons for which no value was reported.² Includes 12,442,356 gallons for which no value was reported.³ Includes 100,099 pounds for which no value was reported.

Table 19 presents statistics as to the mileage of gas mains of establishments in the gas industry proper, and as to the number of stoves and heaters connected with the mains.

The states have quite a different rank with respect to the mileage of gas mains from that which they occupy with respect to the production of gas. Thus, while New York and Illinois, respectively, ranked first and second in 1909 as to both of these items, the production of gas in New York was much more than twice as great as in Illinois, while the mileage of mains re-

ported from New York exceeded that reported from Illinois by less than 30 per cent. California ranked fifth in 1909 in the production of gas, but ranked third in mileage of gas mains. The relative length of mains required to distribute a given quantity of gas depends, of course, upon the density of the population served and the consumption per capita. Where there is a large consumption of gas for heat and power, the length of mains is likely to be less in proportion to the output of gas than where the gas is chiefly consumed for lighting.

Table 19

STATE.	Miles of mains.	Number of gas stoves and heaters connected with mains.
Total	45, 119	3, 603, 435
Alabama.....	298	17, 354
California.....	3, 613	183, 897
Colorado.....	553	60, 459
Connecticut.....	1, 074	68, 936
Delaware.....	119	7, 104
Florida.....	197	20, 550
Georgia.....	395	36, 221
Illinois.....	5, 187	437, 447
Indiana.....	1, 518	97, 998
Iowa.....	1, 390	82, 282
Kentucky.....	360	19, 085
Louisiana.....	344	20, 432
Maine.....	199	6, 002
Maryland.....	756	71, 825
Massachusetts.....	3, 301	168, 442
Michigan.....	1, 837	185, 218
Minnesota.....	793	22, 736
Mississippi.....	134	7, 661
Missouri.....	1, 100	119, 592
Nebraska.....	491	49, 199
New Hampshire.....	251	21, 965
New Jersey.....	3, 003	29, 552
New York.....	6, 687	1, 114, 126
North Carolina.....	153	5, 230
Ohio.....	2, 048	15, 951
Oregon.....	337	22, 924
Pennsylvania.....	3, 529	410, 243
Rhode Island.....	616	17, 223
South Carolina.....	136	6, 024
South Dakota.....	144	6, 635
Tennessee.....	418	29, 567
Texas.....	662	45, 190
Vermont.....	126	8, 943
Virginia.....	395	27, 065
Washington.....	669	33, 750
Wisconsin.....	1, 177	91, 208
All other states.....	1, 109	35, 394

Table 20 presents, for 1909 and 1899, by states, the average value per thousand cubic feet of gas of all kinds combined made by establishments classified as engaged in the gas industry. The comparability of the figures for the different states is slightly affected by differences in the proportions of the several kinds of gas manufactured, but it is much more affected by differences in local conditions as to cost of materials, methods of distribution, the uses to which gas is put, the density of the population served, and the like. In some states gas manufacturing companies buy part of the gas which they distribute from producers of natural gas or from operators of by-product coke ovens, but, on the other hand, there are some companies covered by the statistics which do not distribute gas to the consumer but deliver it to other concerns for that purpose, in which case, of course, the value reported is materially lower than the price ultimately paid by the consumer.

The most conspicuous fact shown by the table is the decline in the average value per thousand cubic feet in most of the states. In 38 of the 44 states listed there was some decline between 1899 and 1909, and in a number of these states the fall was very great. As already indicated, these reductions in average value do

not necessarily represent corresponding reductions in the rates charged for gas under given conditions.

The conspicuous increase in the average value of manufactured gas shown for Kansas is due chiefly to the fact that during the decade natural gas was substituted for artificial gas in the greater part of the state, so that the plants returned for 1909 were few, distant from sources of materials, and in small places. The conditions in West Virginia, where the average value also showed a considerable advance, are somewhat similar to those in Kansas. The increase in average value shown for Pennsylvania is attributable, at least in part, to the fact that the gas supplied to the city of Philadelphia for street and other municipal lighting was not assigned a value in the report for 1899, although the quantity was included, while in 1909 both the quantity and the value of such gas were reported. The only other states in which the average value of gas reported was higher in 1909 than in 1899 were Delaware and Maryland.

Table 20

STATE.	AVERAGE VALUE OF GAS PRODUCED PER THOUSAND CUBIC FEET.	
	1909	1899
United States	\$0.92	\$1.03
Alabama.....	1.10	1.62
Arizona.....	1.44	2.41
Arkansas.....	1.10	1.94
California.....	1.08	1.72
Colorado.....	0.91	1.27
Connecticut.....	0.99	1.21
Delaware.....	1.10	0.92
Florida.....	1.53	1.98
Georgia.....	1.12	1.24
Illinois.....	0.88	0.90
Indiana.....	0.84	1.15
Iowa.....	1.08	1.36
Kansas.....	4.16	1.67
Kentucky.....	0.77	1.29
Louisiana.....	1.27	2.10
Maine.....	1.27	1.50
Maryland.....	1.36	1.25
Massachusetts.....	0.89	1.15
Michigan.....	1.04	1.09
Minnesota.....	0.89	1.30
Mississippi.....	1.19	2.02
Missouri.....	0.93	0.97
Montana.....	1.66	2.29
Nebraska.....	1.23	1.45
Nevada.....	1.92	4.50
New Hampshire.....	1.25	1.41
New Jersey.....	1.05	1.21
New York.....	0.76	0.96
North Carolina.....	1.48	2.39
North Dakota.....	1.60	2.03
Ohio.....	0.77	0.95
Oklahoma.....	1.20	.....
Oregon.....	1.03	2.22
Pennsylvania.....	1.02	0.83
Rhode Island.....	0.94	1.15
South Carolina.....	1.41	1.54
South Dakota.....	1.45	1.84
Tennessee.....	1.02	1.38
Texas.....	1.31	1.85
Vermont.....	1.29	1.82
Virginia.....	1.02	1.08
Washington.....	1.14	1.86
West Virginia.....	1.03	0.86
Wisconsin.....	0.94	1.01
All other states.....	0.93	1.12

MANUFACTURES.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning gas manufacture are presented by states in Tables 21 and 22, Table 21 showing for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture, and Table 22 giving more detailed statistics for 1909.

GAS, ILLUMINATING AND HEATING—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1909	1,296	61,007	277	13,515	37,215	128,350	\$915,537	\$12,385	\$20,931	\$52,428	\$166,814	\$114,388
	1904	1,019	40,043	71	9,406	30,566	73,101	725,035	8,464	17,053	37,180	125,145	87,985
	1899	877	28,363	.....	5,904	22,459	31,787	567,001	5,273	12,436	20,605	75,717	55,112
Alabama.....	1909	13	403	4	140	259	599	4,730	74	133	214	687	473
	1904	13	193	.....	57	136	1,379	926	38	52	87	355	268
	1899	11	115	.....	40	75	124	1,121	31	32	51	233	182
Arizona.....	1909	8	33	.....	13	20	153	578	12	20	47	137	90
	1904	3	10	.....	7	14	14	128	3	6	8	31	23
	1899	3	10	.....	6	4	21	70	2	3	8	18	10
Arkansas.....	1909	5	71	.....	23	48	189	1,651	16	24	90	219	129
	1904	10	147	1	29	117	465	1,438	23	51	72	281	209
	1899	7	57	.....	23	34	107	829	16	22	38	139	101
California.....	1909	74	2,538	1	871	1,666	7,502	47,075	824	1,408	2,604	8,927	6,323
	1904	53	1,303	1	454	848	3,606	31,286	391	650	1,184	5,412	4,228
	1899	41	910	.....	203	707	1,191	20,487	229	497	896	3,162	2,266
Colorado.....	1909	10	416	.....	110	306	646	9,539	90	191	636	1,472	836
	1904	8	247	.....	138	109	333	6,307	91	98	257	805	548
	1899	6	137	.....	28	109	225	1,773	27	54	123	523	400
Connecticut.....	1909	28	1,211	.....	285	926	4,100	16,016	286	557	1,005	3,446	2,441
	1904	26	849	1	208	640	2,237	11,036	190	330	826	2,558	1,732
	1899	21	488	.....	134	354	796	7,906	117	231	362	1,421	1,059
Delaware.....	1909	5	154	1	25	128	333	3,416	27	76	109	364	255
	1904	4	118	2	40	76	105	708	32	52	118	305	187
	1899	4	88	.....	21	67	76	772	18	32	51	200	149
Florida.....	1909	12	273	.....	63	210	746	3,551	70	113	182	585	403
	1904	11	129	.....	34	95	522	1,348	26	35	81	314	233
	1899	11	75	.....	28	47	168	1,156	16	24	41	170	129
Georgia.....	1909	15	604	.....	145	489	689	7,075	123	206	368	1,425	1,057
	1904	12	570	.....	88	482	587	5,832	74	164	291	1,061	770
	1899	12	346	.....	75	271	307	4,269	56	92	142	681	519
Illinois.....	1909	78	8,020	2	1,717	6,301	18,385	131,790	1,667	2,967	6,210	21,052	14,842
	1904	64	4,069	10	1,095	2,964	5,700	97,119	1,344	1,695	4,519	16,008	11,489
	1899	53	3,198	.....	827	2,371	3,377	76,816	770	1,306	1,991	8,774	6,783
Indiana.....	1909	53	1,390	9	453	928	5,845	23,550	356	508	1,102	3,147	2,045
	1904	43	826	3	202	621	1,855	11,972	172	289	571	1,839	1,268
	1899	39	486	.....	146	340	654	7,746	89	172	256	1,034	778
Iowa.....	1909	117	1,151	40	305	806	2,043	15,784	228	380	1,111	2,893	1,782
	1904	60	636	4	164	468	970	8,315	139	254	624	1,832	1,208
	1899	26	316	.....	90	226	379	4,130	70	118	204	808	604
Kansas.....	1909	12	50	8	6	36	275	257	6	22	57	208	161
	1904	22	291	10	63	218	1,727	2,022	45	95	221	523	302
	1899	17	135	.....	50	85	154	1,415	26	49	107	325	218
Kentucky.....	1909	15	500	.....	114	386	991	5,789	93	206	315	1,004	689
	1904	17	509	.....	92	417	792	5,391	95	192	264	961	697
	1899	17	339	.....	60	279	343	4,496	51	122	139	671	532
Louisiana.....	1909	5	374	.....	96	278	650	6,138	81	95	337	1,091	754
	1904	4	317	.....	78	239	152	2,195	64	145	164	751	587
	1899	3	95	.....	34	61	139	1,707	37	41	71	455	384
Maine.....	1909	19	284	2	66	216	349	2,665	58	120	212	549	337
	1904	15	156	.....	56	100	171	2,058	38	63	129	444	315
	1899	9	108	.....	47	61	511	1,426	29	38	73	285	212
Maryland.....	1909	18	817	4	337	476	1,555	26,954	267	220	629	3,223	2,594
	1904	12	416	1	188	227	1,361	21,227	177	128	458	1,994	1,536
	1899	11	321	.....	84	237	469	18,554	85	137	481	1,797	1,316
Massachusetts.....	1909	64	2,800	3	505	2,292	7,371	62,984	529	1,250	3,810	11,074	7,264
	1904	64	2,225	.....	378	1,847	6,444	33,174	425	1,091	3,097	8,036	4,939
	1899	68	1,843	.....	434	1,409	4,212	30,033	420	813	1,652	5,869	4,217
Michigan.....	1909	55	2,435	2	662	1,771	6,055	33,259	540	1,096	2,129	6,748	4,619
	1904	46	1,670	3	380	1,287	2,379	19,712	260	575	1,120	3,866	2,746
	1899	38	885	.....	227	658	502	16,295	142	294	298	1,473	1,175
Minnesota.....	1909	42	1,018	1	169	848	3,538	13,821	171	292	820	2,874	2,054
	1904	16	666	6	86	675	1,238	11,390	79	268	624	2,033	1,409
	1899	11	433	.....	58	375	832	8,900	48	169	304	1,076	772
Mississippi.....	1909	8	139	.....	38	101	148	661	25	39	86	256	170
	1904	5	79	.....	24	55	111	305	12	24	39	125	86
	1899	5	35	.....	11	24	55	422	11	9	17	82	65

THE MANUFACTURE OF GAS.

GAS, ILLUMINATING AND HEATING—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

Table 21—Continued.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
Missouri.....	1909	29	1,403	32	430	941	3,635	33,929	357	636	1,223	4,638	3,415
	1904	28	2,411	.....	585	1,826	3,050	43,647	236	898	1,778	5,585	3,807
	1899	25	984	.....	150	834	1,298	33,504	112	464	756	2,877	2,121
Nebraska.....	1909	48	542	25	117	400	1,015	\$10,047	\$124	\$209	\$445	\$1,416	\$970
	1904	25	386	14	70	302	1,461	6,979	59	142	240	312	672
	1899	9	329	.....	39	290	1,063	6,956	37	80	134	525	391
New Hampshire.....	1909	14	301	2	52	247	220	2,215	46	106	180	581	401
	1904	13	177	.....	35	142	265	1,790	28	73	168	486	318
	1899	13	156	.....	35	121	163	1,519	25	60	86	356	270
New Jersey.....	1909	47	2,804	.....	887	1,917	6,717	15,667	630	853	2,855	9,837	6,982
	1904	38	2,153	.....	786	1,367	2,835	37,596	536	728	1,524	6,372	4,848
	1899	34	1,667	.....	347	1,320	1,479	38,872	272	684	786	3,768	2,982
New York.....	1909	141	9,221	15	2,784	6,422	30,089	278,607	2,982	4,364	15,018	42,347	27,329
	1904	100	8,755	5	1,721	7,029	15,997	224,341	1,859	4,636	10,940	35,315	24,375
	1899	101	6,705	.....	1,324	5,381	6,333	171,379	1,320	3,677	5,867	20,918	15,051
North Carolina.....	1909	14	201	.....	50	151	308	1,772	39	62	123	369	246
	1904	12	145	1	40	104	309	515	20	38	71	223	152
	1899	10	66	.....	19	47	68	683	15	14	37	130	93
North Dakota.....	1909	6	49	1	20	28	52	861	18	13	78	199	121
	1904	4	23	1	12	10	1,825	432	11	6	34	102	68
Ohio.....	1909	38	862	2	194	666	2,165	11,969	181	431	827	3,080	2,253
	1904	58	2,666	.....	427	2,239	2,052	25,081	366	1,083	1,347	4,812	3,465
	1899	73	1,672	.....	283	1,389	1,387	25,017	277	602	885	3,931	3,046
Oklahoma.....	1909	6	59	1	20	38	181	382	12	21	44	115	71
	1904	5	29	.....	14	15	18	1,232	7	8	14	40	26
Oregon.....	1909	8	357	.....	97	260	1,483	3,578	85	194	200	909	709
	1904	5	50	.....	18	32	202	2,473	23	31	84	457	373
	1899	5	43	.....	15	28	16	1,533	14	19	53	175	122
Pennsylvania.....	1909	99	4,584	13	1,452	3,119	9,374	61,857	1,299	1,501	4,099	15,840	11,741
	1904	90	3,953	3	1,068	2,882	6,582	57,064	846	1,478	3,143	10,809	7,666
	1899	89	3,721	.....	577	3,144	3,091	47,313	847	1,506	3,151	7,871	4,720
Rhode Island.....	1909	8	487	.....	75	412	719	7,110	118	303	530	1,833	1,303
	1904	6	524	.....	62	452	652	5,793	80	303	602	1,580	1,078
	1899	6	475	.....	45	430	353	5,664	60	249	244	969	725
South Carolina.....	1909	12	163	1	35	127	207	1,431	34	52	114	334	220
	1904	4	124	.....	16	108	43	1,153	11	31	59	193	134
	1899	4	127	.....	23	104	33	961	12	30	38	172	134
South Dakota.....	1909	17	144	.....	36	108	318	1,317	26	64	120	278	158
	1904	7	61	.....	14	47	115	654	9	26	48	148	100
Tennessee.....	1909	11	530	4	104	422	613	9,370	98	164	357	1,282	925
	1904	11	412	4	50	358	624	2,185	58	127	204	830	626
	1899	14	267	.....	49	218	234	2,304	41	65	135	572	437
Texas.....	1909	27	746	3	168	575	1,090	6,202	138	288	545	1,644	1,099
	1904	19	246	1	81	164	325	2,231	78	103	197	719	522
	1899	11	112	.....	41	71	130	1,764	46	46	94	380	286
Utah.....	1909	3	201	.....	34	167	291	4,162	36	108	168	366	198
	1904	3	48	.....	7	41	217	852	7	22	32	160	128
Vermont.....	1909	9	108	.....	38	70	153	1,479	20	43	100	278	178
	1904	6	46	.....	17	29	187	459	13	13	38	129	91
	1899	7	28	.....	13	15	67	477	7	8	20	71	51
Virginia.....	1909	21	494	1	115	378	1,116	4,868	95	217	431	1,472	1,041
	1904	19	350	1	81	268	357	2,747	64	136	285	980	695
	1899	12	186	.....	53	133	206	2,625	42	85	131	483	352
Washington.....	1909	12	675	.....	210	465	1,479	13,978	200	273	661	1,684	1,023
	1904	7	197	.....	89	108	454	7,633	74	78	149	602	453
	1899	6	118	.....	37	81	13	1,621	26	42	77	316	239
West Virginia.....	1909	4	78	.....	17	61	45	331	12	47	36	203	167
	1904	7	101	.....	15	86	58	676	12	44	60	158	98
	1899	8	106	.....	26	80	60	567	10	40	33	151	118
Wisconsin.....	1909	49	1,505	100	342	1,063	3,278	25,452	285	583	1,389	4,001	2,612
	1904	33	1,184	.....	273	911	2,859	18,869	221	464	819	2,911	2,092
	1899	25	655	.....	123	532	681	7,375	89	268	321	1,397	1,076
All other states.....	1909	17	812	.....	95	717	1,640	11,670	167	476	812	2,728	1,916
	1904	11	576	.....	68	508	1,466	6,744	128	333	690	2,088	1,398
	1899	16	526	.....	79	447	480	6,544	131	242	452	1,479	1,027

¹ Figuree can not be shown without disclosing individual operations.

² Excluding statistics for one establishment in Indian Territory.

Table 22		PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Pri- mary horse- power.
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Average number.	Wage earners.		Total.	16 and over.		Under 16.			
					Male.	Female.		Number, 15th day of—			Male.	Female.	Male.	Female.		
								Maximum month.	Minimum month.							
1 United States.....	1,296	51,007	277	2,708	9,121	1,685	37,215	Je 40,412	Fe 32,562	37,398	37,308	71	16	1	128,350	
2 Alabama.....	13	403	4	40	90	10	259	Au 292	Fe 215	268	268				590	
3 Arizona.....	8	33		6	5	2	20	Ja ¹ 20	Fe ¹ 19	20	20				153	
4 Arkansas.....	5	71		7	9	7	48	Ap 55	Ja 42	43	43				189	
5 California.....	74	2,538	1	169	612	90	1,666	No 1,786	My 1,593	1,783	1,783				7,502	
6 Colorado.....	10	416		23	65	22	306	De 346	Ap 267	346	346				646	
7 Connecticut.....	28	1,211		78	145	62	926	Au 1,069	Fe 738	916	909	3	4		4,100	
8 Delaware.....	5	154	1	8	12	5	128	Au 156	Ja ¹ 117	123	123				333	
9 Florida.....	12	273		26	32	5	210	De 239	Ap 181	240	240				746	
10 Georgia.....	15	604		36	91	18	459	Oc 482	Ja 443	464	464				689	
11 Idaho.....	3	45		4	4	2	35	De 57	Fe 24	32	32				27	
12 Illinois.....	78	8,020	2	269	1,315	133	6,301	Je 7,135	Fe 5,018	6,785	5,785				18,385	
13 Indiana.....	53	1,390	9	101	274	78	928	Je 1,012	Ja 799	974	973	1			5,845	
14 Iowa.....	117	1,151	40	111	156	38	806	Jy 970	Ja 652	799	796	1	1	1	2,043	
15 Kansas.....	12	50	8	4	1	1	36	Ap 38	Ja ¹ 35	37	37				275	
16 Kentucky.....	15	500		49	37	28	386	Jy 407	Se 370	392	390	2			991	
17 Louisiana.....	5	374		9	82	5	278	My 305	Fe 229	264	264				650	
18 Maine.....	19	284	2	24	30	12	216	Jy 327	Mh 143	186	186				349	
19 Maryland.....	18	817	4	40	265	32	476	My 603	Fe 336	415	415				1,555	
20 Massachusetts.....	64	2,800	3	190	188	127	2,292	Jy 2,541	Mh 2,020	2,239	2,226	13			7,371	
21 Michigan.....	55	2,435	2	152	318	192	1,771	De 1,974	Mh 1,514	1,974	1,969	4	1		6,055	
22 Minnesota.....	42	1,018	1	32	114	23	848	Je 963	Mh 756	805	805				3,538	
23 Mississippi.....	8	139		14	20	4	101	Oc 110	Au 90	102	102				148	
24 Missouri.....	29	1,403	32	56	239	135	941	Je 1,195	Ja 732	873	872		1		3,635	
25 Montana.....	5	63		8	5	2	48	Jy 62	Fe 36	50	50				129	
26 Nebraska.....	48	542	25	35	73	9	400	Oc 451	Ja 340	439	439				1,015	
27 Nevada.....	3	13		3	3	1	6	Ja ² 6	Jy ² 6	6	6				83	
28 New Hampshire.....	14	301	2	20	25	7	247	Jy 323	Ja 191	305	305				220	
29 New Jersey.....	47	2,804	4	139	709	39	1,917	Je 1,974	Ja 1,864	1,891	1,890	1			6,717	
30 New York.....	141	9,221	15	398	2,162	224	6,422	Je 6,950	Fe 5,538	6,643	6,625	10	8		30,089	
31 North Carolina.....	14	201		25	18	7	151	Jy 172	Se 138	150	150				308	
32 North Dakota.....	6	49	1	10	7	3	28	My 32	Fe 23	28	28				52	
33 Ohio.....	38	862	2	62	99	33	666	Mh 866	Jy ¹ 483	858	858				2,165	
34 Oklahoma.....	6	59	1	7	10	3	38	Ja ¹ 38	Fe ¹ 37	38	38				181	
35 Oregon.....	8	357		12	58	27	260	De 282	Au 236	282	282				1,483	
36 Pennsylvania.....	99	4,584	13	208	1,146	98	3,119	Jy 3,406	Fe 2,784	3,136	3,125	11			9,374	
37 Rhode Island.....	8	487		21	43	11	412	Au 445	Fe 369	403	387	16			719	
38 South Carolina.....	12	163	1	11	20	4	127	De 143	Jy ¹ 115	143	143				207	
39 South Dakota.....	17	144		17	9	10	108	Jy 160	Ja ¹ 78	102	102				318	
40 Tennessee.....	11	530	4	24	67	13	422	De 514	Fe 373	515	515				613	
41 Texas.....	27	746	3	56	95	17	575	Jy 704	Fe 404	473	473				1,090	
42 Utah.....	3	201		6	27	1	167	Jy 261	Fe 115	138	138				291	
43 Vermont.....	9	108		14	14	10	70	My 97	Mh 60	62	62				153	
44 Virginia.....	21	494	1	38	69	8	378	Jy 418	Je 338	381	380		1		1,116	
45 Washington.....	12	675		33	153	24	465	My 523	Oc 403	522	522				1,479	
46 West Virginia.....	4	78		7	10		61	Ja ¹ 62	Je 57	61	61				45	
47 Wisconsin.....	49	1,505	100	84	165	93	1,063	Jy 1,172	Fe 925	1,042	1,033	9			3,278	
48 All other states ²	6	691		23	30	10	628			648	648				1,401	

¹ Same number reported for one or more other months.

² Same number reported throughout the year.

DETAILED STATISTICS, BY STATES: 1909.

	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1	\$315,536,762	\$113,500,978	\$4,715,385	\$7,669,886	\$20,830,697	\$38,198,031	\$13,231,813	\$6,247,563	\$7,838,275	\$114,570	\$13,558,668	\$166,814,371	\$114,388,527
2	4,729,503	557,160	35,354	38,593	133,344	141,910	72,172	.....	34,869	278	100,640	687,145	473,063
3	577,982	101,117	7,562	4,785	19,658	40,526	6,579	.....	4,558	.....	17,469	137,400	90,295
4	1,651,368	157,320	9,103	7,288	24,371	53,781	36,600	.....	8,636	.....	17,641	218,891	128,510
5	47,074,650	6,530,387	311,713	512,005	1,407,704	2,288,476	315,353	6,487	324,940	207	1,363,602	8,926,544	6,322,715
6	9,538,549	1,171,043	25,617	63,955	190,512	111,907	523,647	.....	69,432	.....	185,973	1,472,470	836,916
7	16,016,124	2,297,645	127,122	159,016	557,271	827,511	177,429	34,950	114,015	19,394	280,937	3,445,961	2,441,021
8	3,415,823	273,934	15,428	11,200	76,214	71,636	37,295	.....	7,271	112	54,286	363,769	254,838
9	3,550,624	418,380	40,435	29,761	113,207	118,990	63,426	.....	15,368	3,000	34,193	685,398	402,982
10	7,074,534	881,199	46,609	78,002	205,623	310,552	57,175	.....	75,000	5,215	105,023	1,425,271	1,057,544
11	525,651	104,738	6,115	4,067	26,596	34,874	17,563	.....	2,444	.....	13,079	113,472	61,035
12	131,789,940	13,938,452	631,984	935,387	2,967,342	5,394,978	814,706	580,035	928,147	3,725	1,684,148	21,052,100	14,842,416
13	23,550,122	2,313,572	162,488	193,987	508,318	840,317	261,603	1	88,584	12,654	245,620	3,147,305	2,045,385
14	15,783,512	2,040,600	114,660	113,462	379,738	838,666	272,626	324	105,696	30	215,408	2,892,646	1,781,364
15	257,064	88,411	4,770	1,080	22,069	40,888	15,761	.....	1,046	.....	576	207,586	150,937
16	5,788,607	777,987	62,265	31,080	205,730	261,298	53,247	25,000	47,090	175	92,102	1,003,582	689,037
17	6,137,630	621,220	18,726	62,228	94,623	218,859	117,780	.....	65,741	.....	43,263	1,091,309	754,670
18	2,664,690	450,309	31,006	27,003	120,172	153,260	78,699	.....	19,983	5,146	35,040	548,691	336,732
19	26,953,646	1,512,742	50,191	216,905	220,158	503,490	125,993	.....	207,921	.....	188,084	3,223,001	2,593,518
20	52,983,671	7,053,506	323,861	205,199	1,250,007	2,770,366	1,039,768	10	707,108	27,421	739,826	11,074,354	7,264,220
21	33,258,917	4,472,212	244,829	294,686	1,096,124	1,448,684	680,433	840	308,202	7,584	390,830	6,748,070	4,618,953
22	13,820,881	1,755,256	57,012	113,962	292,212	787,471	32,361	.....	156,869	1,000	314,369	2,874,281	2,054,449
23	660,874	189,732	14,179	11,112	59,119	58,572	27,196	.....	8,808	.....	30,746	255,582	169,814
24	33,928,814	2,962,194	108,164	248,747	635,548	1,116,129	107,326	3,196	329,606	.....	413,419	4,637,544	3,414,089
25	1,041,030	153,086	7,825	5,495	41,183	60,317	16,425	.....	5,474	1,107	15,260	189,912	113,170
26	10,047,410	968,462	66,964	57,058	209,003	317,434	127,339	525	109,102	1,005	79,982	1,415,002	970,179
27	235,659	53,976	3,300	1,740	8,060	35,067	1,277	.....	1,711	.....	2,821	67,263	30,919
28	2,214,529	412,116	23,355	22,798	105,891	150,367	29,994	175	18,922	1,628	58,996	581,395	401,044
29	15,666,761	9,092,466	182,279	447,263	853,129	1,830,013	1,024,721	3,930,581	386,965	485	437,030	9,836,806	6,982,072
30	278,606,545	28,659,181	983,886	1,997,932	4,363,632	10,600,770	4,417,636	11,963	2,549,473	3,194	3,730,695	42,346,726	27,328,320
31	1,771,505	273,260	24,188	15,181	62,324	99,055	24,436	.....	9,808	.....	38,268	369,375	245,884
32	860,894	132,823	11,747	5,919	13,162	56,983	20,849	500	8,156	2,767	14,740	198,633	120,801
33	11,969,337	2,182,051	96,435	84,123	431,305	741,935	84,809	363,695	175,832	10,862	193,055	3,079,670	2,252,926
34	382,131	90,444	6,482	5,105	20,700	40,630	2,942	.....	4,452	.....	10,133	114,851	71,279
35	3,578,119	714,524	22,706	62,752	194,176	183,560	16,738	.....	39,349	1,000	194,243	909,115	708,817
36	61,856,506	9,188,766	264,796	974,689	1,500,850	2,997,543	1,101,051	1,287,642	62,836	3,276	996,083	15,839,612	11,741,018
37	7,109,560	1,159,644	64,216	53,370	302,664	456,477	74,021	.....	89,010	.....	119,886	1,833,176	1,302,678
38	1,431,202	250,050	23,959	9,920	51,638	94,005	20,044	12	11,379	.....	39,093	333,877	219,828
39	1,317,421	239,914	15,418	10,106	63,716	78,367	41,196	.....	5,776	.....	25,345	277,569	158,016
40	9,369,945	809,700	45,079	52,503	163,958	235,839	120,836	450	85,535	.....	105,500	1,281,558	924,883
41	6,202,454	1,154,599	84,065	53,625	288,307	372,048	172,789	750	70,285	50	112,680	1,644,066	1,099,229
42	4,162,259	351,673	13,970	22,500	108,139	111,746	56,423	.....	8,763	.....	30,132	365,855	197,686
43	1,478,518	192,438	11,684	8,028	43,209	66,408	33,185	60	9,079	.....	20,785	278,138	178,545
44	4,867,894	822,399	43,806	50,808	216,780	351,374	79,503	150	19,947	.....	60,031	1,472,384	1,041,507
45	13,978,035	1,373,586	63,140	136,977	273,260	450,266	210,642	.....	166,823	.....	72,478	1,683,635	1,022,727
46	331,386	96,568	5,436	6,290	46,668	25,729	9,844	.....	600	.....	2,001	202,531	166,958
47	25,452,035	2,643,391	115,213	170,171	583,306	797,312	591,303	.....	221,987	2,620	161,479	4,000,981	2,612,366
48	9,872,451	1,816,685	85,751	54,143	399,977	629,625	19,072	207	147,777	.....	480,133	2,359,869	1,711,172

* All other states embrace: District of Columbia, 3 establishments; New Mexico, 2; Wyoming, 1.

PETROLEUM REFINING

(655)

PETROLEUM REFINING.

GENERAL STATISTICS.

Scope of the industry.—This industry includes only such establishments as are engaged primarily in the refining of crude petroleum by distillation. Establishments which purchase refined or partly refined petroleum products and compound them with vegetable, animal, or mineral oils, or other substances, in order to produce a special composition are, therefore, excluded.

Comparison with earlier censuses.—Although crude petroleum was utilized commercially in the United States prior to 1879, the statistics for the petroleum refining industry given in the census reports prior to

that time are not comparable with those for the later censuses. In 1859, 78 establishments were reported with products valued at \$6,397,680, and in 1869 there were 170 establishments reported, with products valued at \$26,942,287.

Table 1 summarizes the statistics of the industry for each census from 1879 to 1909, inclusive. It should be noted that although the statistics for the industry cover all the crude petroleum refineries in the country they do not show the total number of these refineries because several of them are sometimes reported as a single establishment. (See Introduction.)

Table 1	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	147	98	67	94	86	119.4	50.0	46.3	-28.7	9.3
Persons engaged in the industry.....	16,640	18,768	13,447	(2)	(2)	23.7	-11.3	39.6	.....	.....
Proprietors and firm members.....	42	24	47	(2)	(2)	-10.6	75.0	-48.9	.....	.....
Salaried employees.....	2,669	1,974	1,201	(2)	(2)	122.2	35.2	64.4	.....	.....
Wage earners (average number).....	13,929	16,770	12,199	11,403	9,869	14.2	-16.9	37.5	(3)	(*)
Primary horsepower.....	90,268	46,019	36,127	32,536	(2)	149.9	96.2	27.4	11.0	.....
Capital.....	\$181,916,205	\$136,280,541	\$95,327,892	\$77,416,296	\$27,325,746	90.8	33.5	43.0	23.1	183.3
Expenses.....	\$222,477,636	\$157,398,153	\$114,718,679	\$76,977,469	(2)	93.9	41.3	37.2	49.0	.....
Services.....	\$13,758,945	\$12,713,432	\$8,528,487	\$6,989,478	\$4,381,572	61.3	8.2	49.1	22.0	59.5
Salaries.....	\$3,928,867	\$2,724,065	\$1,811,400	(2)	(2)	116.9	44.2	50.4	.....	.....
Wages.....	\$9,830,078	\$9,989,367	\$6,717,087	(2)	(2)	46.3	-1.6	48.7	.....	.....
Materials.....	\$199,273,402	\$139,387,213	\$102,859,341	\$67,918,723	\$34,999,101	93.7	43.0	35.5	51.4	94.1
Miscellaneous.....	\$9,445,289	\$5,297,508	\$3,330,851	\$2,069,268	(2)	183.6	78.3	59.0	61.0	.....
Value of products.....	\$236,997,659	\$175,005,320	\$123,929,384	\$85,001,198	\$43,705,218	91.2	35.4	41.2	45.8	94.5
Value added by manufacture (value of products less cost of materials).....	\$37,724,257	\$35,618,107	\$21,070,043	\$17,082,475	\$8,706,117	79.0	5.9	69.0	23.3	96.2
Crude petroleum treated (barrels).....	120,775,439	66,982,862	52,011,005	30,662,629	17,417,455	132.2	80.3	28.8	69.6	76.0

¹ A minus sign (—) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The industry advanced steadily during the 30 years covered by Table 1, the amount of petroleum refined in 1909 being almost seven times as great, and the cost of materials and value of products each being over five times as great as in 1879. The increase in the number of wage earners was comparatively slight, 41.1 per cent during the 30-year period. At the census of 1909 one of the largest companies in the United States made separate reports for their box, cooperage, and tin shops, which at prior censuses had been included with the reports for the refineries. This has considerably affected the number of wage earners shown for the industry in 1909 as compared with those for prior censuses. During the decade 1899-1909 the average number of wage earners increased from 12,199 to

13,929, or 14.2 per cent; while the value of products increased from \$123,929,384 to \$236,997,659, or 91.2 per cent; and the value added by manufacture from \$21,070,043 to \$37,724,257, or 79 per cent. At each census the cost of materials constituted a very large part of the expenses reported for the industry. In 1909 this cost amounted to 84.1 per cent of the total value of products as compared with 79.6 per cent in 1904, 83 per cent in 1899, 79.9 per cent in 1889, and 80.1 per cent in 1879.

Comparative summary, by states.—Table 2 summarizes the more important statistics of the industry for the three states for which figures for 1909, 1904, and 1899 can be given without disclosing individual operations.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States	1909	147	16,840	42	2,689	13,929	90,268	\$181,916	\$3,929	\$9,830	\$199,273	\$236,998	\$37,725
	1904	88	18,768	24	1,974	16,770	46,018	136,281	2,724	9,983	138,387	175,005	35,616
	1899	67	13,447	47	1,201	12,199	36,127	95,328	1,811	6,717	102,859	123,929	21,070
California	1909	29	1,146	4	212	930	5,630	13,881	367	801	13,898	17,878	3,980
	1904	19	840	.....	162	678	1,283	5,453	212	477	4,131	5,749	1,618
	1899	4	72	.....	19	53	180	478	40	42	490	698	208
Ohio	1909	10	2,039	.....	380	1,659	4,324	11,152	412	1,028	8,145	10,754	2,609
	1904	12	2,116	.....	216	1,900	4,386	10,385	266	1,054	7,662	10,949	3,287
	1899	9	1,227	2	217	1,008	2,491	10,913	234	552	6,177	8,397	2,220
Pennsylvania	1909	41	3,423	36	487	2,900	35,212	38,990	768	1,861	47,440	53,088	5,648
	1904	43	4,657	22	408	4,227	11,609	32,847	557	2,371	38,922	47,460	8,538
	1899	38	3,616	40	277	3,299	13,328	26,581	408	1,682	27,514	34,978	7,464
All other states	1909	67	10,032	2	1,590	8,440	45,102	117,893	2,382	6,140	129,790	155,278	25,488
	1904	24	11,155	2	1,188	9,965	28,741	87,596	1,689	6,087	88,672	110,847	22,175
	1899	16	8,532	5	688	7,839	20,128	57,356	1,134	4,441	68,678	79,856	11,178

Separate figures for 1909 only are given in Table 22 for each of the three states shown in Table 2, and also for Kansas and Oklahoma. The statistics for the remaining states can not be shown separately without disclosing individual operations, but the following table shows for 1909, 1904, and 1899 the rank of each state in number of wage earners, value of products, and value added by manufacture.

STATE.	RANK OF STATE IN—								
	Average number of wage earners.			Value of products.			Value added by manufacture.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
New Jersey.....	1	2	2	1	2	2	1	2	4
Pennsylvania.....	2	1	1	2	1	1	2	1	1
New York.....	3	3	3	3	3	3	6	3	2
Texas.....	5	6	10	4	7	9	4	6	10
California.....	6	7	9	5	8	8	5	7	7
Indiana.....	7	4	4	6	4	4	3	4	3
Ohio.....	4	5	5	7	5	5	7	5	5
Illinois.....	10	.....	.....	8	.....	.....	8	.....	.....
Missouri.....	15	.....	.....	9	.....	.....	11	.....	.....
Kansas.....	8	10	11	10	9	11	9	10	11
Maryland.....	11	8	6	11	8	6	12	8	6
West Virginia.....	12	9	7	12	10	7	14	11	8
Kentucky.....	9	.....	.....	13	.....	.....	10	.....	.....
Oklahoma.....	13	.....	.....	14	.....	.....	13	.....	.....
Colorado.....	14	11	8	15	11	10	15	9	9
Louisiana.....	16	13	.....	16	13	.....	16	13	.....
Wyoming.....	.....	12	.....	.....	12	.....	.....	12	.....
Michigan.....	.....	.....	12	.....	.....	12	.....	.....	12

As measured by average number of wage earners, value of products, and value added by manufacture, New Jersey ranked first in the petroleum refining industry at the census of 1909; Pennsylvania and New York second and third, respectively, in average number of wage earners and value of products; while Indiana ranked third in value added by manufacture. The table shows considerable change in the relative rank in value of products of the states at the several censuses, Texas advancing from ninth place to fourth, and California from eighth to fifth during the decade 1899-1909, while during the same period Indiana fell from fourth place to sixth, and Ohio from fifth to seventh.

Persons engaged in the industry.—Table 4 shows, for 1909, the number of persons engaged in the petroleum refining industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes	16,640	16,251	389
Proprietors and officials.....	671	661	10
Proprietors and firm members.....	42	37	5
Salaried officers of corporations.....	211	207	4
Superintendents and managers.....	418	417	1
Clerks.....	2,040	1,820	220
Wage earners (average number).....	13,929	13,770	159
18 years of age and over.....	13,886	13,727	159
Under 16 years of age.....	43	43	.....

The average number of persons engaged in the petroleum refining industry during 1909 was 16,640, of whom 13,929, or 83.7 per cent, were wage earners; 671, or 4 per cent, proprietors and officials; and 2,040, or 12.3 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 16,251, or 97.7 per cent, were males and 389, or 2.3 per cent, were females. Only 389 women were employed, and of these, 220 were clerks and 159, wage earners. The average number of wage earners under 16 years of age was only 43. The average number of wage earners for California, Ohio, and Pennsylvania for 1909, 1904, and 1899 is given in Table 2.

The average number distributed by sex and age is not shown for the individual states, but Table 22 gives such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904 it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 5.

Table 5

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Percent of increase, ¹ 1904-1909
	Amount.	Per cent distribution.	Amount.	Per cent distribution.	
Total.....	16,640	100.0	13,768	100.0	-11.3
Proprietors and firm members.....	42	0.3	24	0.1	75.0
Salaried employees.....	2,669	16.0	1,974	10.5	35.2
Wage earners (average number).....	13,929	83.7	16,770	89.4	-16.9

¹ A minus sign (-) denotes decrease.

Although wage earners at both censuses represented more than 80 per cent of the total number of persons engaged in the industry, their number decreased 16.9 per cent from 1904 to 1909, while salaried employees shows an increase of 35.2 per cent for the five years.

Table 6 shows the average number of wage earners in the industry distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899. The number of women and children employed was so small that figures relative to increases and decreases have little significance.

Table 6

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	13,929	100.0	16,770	100.0	12,199	100.0
16 years of age and over.....	13,836	99.7	16,338	97.4	12,001	98.4
Male.....	13,727	98.5	16,256	96.9	11,935	97.8
Female.....	159	1.1	82	0.5	66	0.5
Under 16 years of age.....	43	0.3	432	2.6	198	1.6

Wage earners employed, by months.—Table 7 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the six states in which an average of 500 or more wage earners were employed.

Table 7

STATE.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909 ¹												
	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	13,929	13,319	13,079	12,952	13,076	13,208	13,617	14,156	14,221	14,434	15,032	15,249	14,805
California.....	930	882	880	862	913	952	965	938	931	966	963	974	939
New Jersey.....	2,906	2,794	2,839	2,823	2,908	2,929	2,860	2,953	2,946	2,926	2,897	3,048	2,951
New York.....	1,932	1,877	1,828	1,779	1,798	1,801	1,981	2,050	2,074	1,993	1,952	2,095	1,949
Ohio.....	1,659	1,628	1,608	1,615	1,549	1,600	1,534	1,546	1,534	1,655	1,905	1,943	1,891
Pennsylvania.....	2,900	2,685	2,628	2,535	2,547	2,643	2,757	2,947	2,936	3,124	3,361	3,320	3,297
Texas.....	1,281	1,277	1,167	1,193	1,144	1,102	1,206	1,356	1,434	1,358	1,473	1,348	1,308

¹ The month of maximum employment for each state is indicated by holdface figures and that of minimum employment by italic figures.

The industry is not subject to very great seasonal changes. The largest number of wage earners employed in the industry during any month in 1909 was 15,249, in November, and the smallest number, 12,952, in March, the minimum number being equal to 84.9 per cent of the maximum. In 1904 the maximum number, 17,621, was shown for June, and the minimum number, 15,067, for December, the latter number being equal to 85.5 per cent of the former.

Prevailing hours of labor.—In Table 8 the wage earners in the industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Practically all (99.7 per cent) of the wage earners employed in the industry in 1909 were in establishments where the prevailing number of hours were 54 or more per week. Of the seven groups shown in

Table 8, by far the largest was that made up of the wage earners in establishments where the prevailing hours were 54 per week, such wage earners constituting 62.2 per cent of the total number. This group was the most important, likewise, in all but two of the states for which figures are given. In Texas the wage earners in establishments where the prevailing hours per week were 72 or over formed the largest group, while in Ohio 60 hours per week was the most common working time.

Table 8

STATE.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909						
	Total.	In establishments with prevailing hours—					
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	13,929	43	8,070	91	1,894	673	2,538
California.....	930	25	485	31	15	64	307
New Jersey.....	2,906	.....	2,323	.....	100	.....	473
New York.....	1,932	.....	1,904	.....	.....	.....	28
Ohio.....	1,659	.....	480	30	1,122	19	8
Pennsylvania.....	2,900	.....	1,596	.....	418	270	616
Texas.....	1,281	.....	467	.....	.....	206	608

Character of ownership.—Table 9 presents statistics with respect to the character of ownership of the establishments in the petroleum refining industry.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	147	98	\$236,987,659	\$175,005,320
Individual.....	4	8	1,922,431	2,646,390
Firm.....	12	17	2,535,259	2,810,428
Corporation.....	131	83	232,539,969	169,548,502
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	2.7	8.2	0.8	1.5
Firm.....	8.2	17.1	1.1	1.6
Corporation.....	89.1	84.7	98.1	96.9

¹ Includes one establishment under "other" ownership.

This table shows the great and increasing extent to which the industry is dominated by establishments under corporate ownership. Corporations controlled 89.1 per cent of the establishments in the industry, and reported 98.1 per cent of the total value of products in 1909, as compared with 84.7 per cent and 96.9 per cent, respectively, in 1904.

Of the total number of wage earners in the industry, 99, or seven-tenths of 1 per cent, were employed in establishments under individual ownership; 152, or 1.1 per cent, by establishments under firm ownership; and 13,678, or 98.2 per cent, by establishments under corporate ownership.

Establishments under ownership other than corporate were reported from only three states, California, Pennsylvania, and Oklahoma, Pennsylvania being the only state in which such establishments were of importance. Of the 41 establishments in Pennsylvania, 4 were under individual ownership, 9 under firm ownership, and 28 under corporate ownership; those under individual ownership gave employment to an average of 99 wage earners, or 3.4 per cent of

the total number for the industry and reported products valued at \$1,922,431, or 3.6 per cent of the total, while establishments under firm ownership gave employment to an average of 141 wage earners, or 4.9 per cent of the total, and reported products valued at \$2,456,523, or 4.6 per cent of the total.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	147	98	\$236,987,659	\$175,005,320
Less than \$5,000.....	1	3	.....	11,112
\$5,000 and less than \$20,000.....	15	6	1,206,153	76,683
\$20,000 and less than \$100,000.....	25	19	1,524,305	973,691
\$100,000 and less than \$1,000,000..	71	51	26,535,548	19,389,349
\$1,000,000 and over.....	35	19	208,671,648	154,549,485
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	0.7	3.1	.....	(3)
\$5,000 and less than \$20,000.....	10.2	6.1	10.1	(3)
\$20,000 and less than \$100,000.....	17.0	19.4	0.6	0.6
\$100,000 and less than \$1,000,000..	48.3	52.0	11.2	11.1
\$1,000,000 and over.....	23.8	19.4	88.0	88.3

¹ Includes the group "less than \$5,000." ² Less than one-tenth of 1 per cent.

More than 99 per cent of the value of products of the industry both in 1909 and 1904 was reported by establishments with products to the value of at least \$100,000, and nearly 90 per cent at each census was reported by establishments having products to the value of \$1,000,000 or over. The gain of this latter class of establishments in value of products was more than 35 per cent. Establishments with products of less than \$100,000 in value constituted nearly 30 per cent of the total number at both censuses.

Table 11 classifies the establishments in the leading states in the petroleum refining industry according to the number of wage earners employed.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—															
			1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.....	147	13,929	24	71	51	647	32	985	11	845	11	1,804	12	4,491	4	2,620	2	2,486
California.....	29	930	6	16	18	211	3	76	.....	.....	.....	.....	2	627	.....	.....	.....	.....
New Jersey.....	6	2,906	.....	.....	.....	.....	.....	.....	2	184	.....	.....	2	852	.....	.....	.....	.....
New York.....	7	1,932	1	4	.....	.....	1	23	.....	.....	1	205	3	1,129	1	548	1	1,322
Ohio.....	10	1,859	.....	2	27	3	99	1	97	.....	2	248	.....	430	.....	.....	.....	.....
Pennsylvania.....	41	2,900	3	12	13	183	18	578	2	115	3	559	1	289	1	708	.....	.....
Texas.....	8	1,281	.....	.....	2	28	.....	.....	2	153	2	308	2	792	.....	.....	.....	.....

Of the 147 establishments reported in 1909, 51 per cent employed from 1 to 20 wage earners each; 29.3 per cent from 21 to 100; and 15.6 per cent from 101 to 500. There were only 6 establishments that employed more than 500 wage earners. Of the total number of wage earners, 5.2 per cent worked in estab-

lishments employing from 1 to 20 wage earners; 13 per cent in those employing from 21 to 100; 45.2 per cent in those employing from 101 to 500; and 36.7 per cent in those employing more than 500.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show

the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in the establishments of the industry in 1909 to have been \$222,477,636, distributed as follows: Cost of materials, \$199,273,402, or 89.6 per cent; wages \$9,830,078, or 4.4 per cent; salaries, \$3,928,867, or 1.8 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$9,445,289, or 4.2 per cent.

Engines and power.—Table 12 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the industry increased from 36,127 horsepower in 1899 to 90,268 horsepower in 1909, or 149.9 per cent during the decade. In 1909, as in 1904 and 1899, steam was the principal source of power, though gas and other internal-combustion engines were relatively more important in this industry than in most of the other industries in the United States. Little purchased electric current was used at either census, but between 1899 and

1909 there was an increase from 925 to 8,808 in the horsepower of motors run by current generated in the establishments reporting.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	2,142	1,143	892	80,268	48,019	36,127	100.0	100.0	100.0
Owned.....	2,138	1,129	892	89,955	45,869	36,127	99.7	99.7	100.0
Steam.....	2,039	1,072	864	83,707	43,480	30,568	92.7	94.5	84.6
Gas.....	99	57	28	5,870	2,059	709	6.5	4.5	2.0
Other.....	.....	.....	.....	378	330	4,850	0.4	0.7	13.4
Rented.....	4	14	.....	313	150	.....	0.3	0.3	.....
Electric.....	4	14	.....	28	150	.....	(¹)	0.3	.....
Other.....	.....	.....	.....	285	.....	.....	0.3	.....	.....
Electric motors.....	511	238	69	8,808	3,488	825	100.0	100.0	100.0
Run by current generated by establishment.....	507	224	69	8,780	3,318	925	99.7	95.7	100.0
Run by rented power.....	4	14	.....	28	150	.....	0.3	4.3	.....

¹ Less than one-tenth of 1 per cent.

Table 13 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in each of the leading states.

STATE.	Number of establishments reporting.	Total horsepower.	PRIMARY HORSEPOWER.						ELECTRIC HORSEPOWER.		FUEL USED.				
			Owned by establishments reporting.				Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).			
United States.....	130	90,268	89,955	83,707	5,870	378	28	285	8,808	8,780	1,347,519	1,264,841	99,595	3,473,758	7,519,859
California.....	25	5,630	5,542	5,422	120	.....	13	75	799	786	.....	.....	.....	1,286,666	.....
New Jersey.....	6	23,902	23,902	23,677	225	.....	.....	.....	2,294	2,294	898,157	4,523	89,312	137,429	6,568
New York.....	7	5,091	5,081	4,991	90	.....	.....	10	977	977	129,863	133,966	8,323	44,710	167,478
Ohio.....	9	4,324	4,324	3,864	410	50	.....	.....	138	138	.....	248,089	.....	32,507	519,690
Pennsylvania.....	40	35,212	35,212	30,394	4,490	328	.....	.....	3,725	3,725	316,138	453,106	.....	64,017	4,527,475
Texas.....	7	6,208	6,193	6,158	35	.....	15	.....	392	377	.....	.....	.....	1,133,516	.....
All other states.....	36	9,901	9,701	9,201	500	.....	.....	200	463	483	3,361	425,187	1,960	774,913	2,298,648

Fuel consumed.—Since the chief method of refining petroleum is that of distillation, the use of a large amount of fuel is necessary, not only to produce the heat used in the distillation, but in the generation of power. Naturally a large portion of the fuel used for both heat and power is gas or oil, since in most sections of the country where oil abounds natural gas is obtainable and is utilized. Of the 3,473,758 barrels of oil reported as used for fuel in the refineries in 1909, 1,286,666 barrels, or 37 per cent of the total, was

reported by California, while of the total quantity of gas reported (7,519,859,000 cubic feet), 4,527,475,000 cubic feet, or 60.2 per cent of the total, was reported by Pennsylvania. Coal, also, was largely used as fuel in the industry. There were 1,347,519 tons of anthracite coal consumed, the largest amount, 898,157 tons, or 66.7 per cent of the total, being reported by New Jersey, while of the 1,264,841 tons of bituminous coal used, 453,106 tons, or 35.8 per cent of the total, was reported by Pennsylvania.

SPECIAL DATA RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

Materials.—Table 14 shows statistics of the materials used in the industry in 1909.

MATERIAL.	Quantity (barrels).	Cost.
Total		\$199,273,402
Crude petroleum, total.....	120,775,439	152,307,040
Mid-Continent (Kansas and Oklahoma).....	42,895,051	41,959,100
Illinois.....	26,236,883	36,218,407
Appalachian.....	24,508,218	47,545,138
California.....	13,481,885	10,108,541
Lima-Indiana.....	8,083,096	11,455,764
Gulf (Texas and Louisiana).....	5,262,664	4,669,486
Colorado.....	307,642	350,604
Sulphuric acid, caustic soda, sulphur, and pyrites.....		4,003,198
Coopers' and carpenters' materials, barrels, and other wooden packages.....		8,937,421
Tinners' materials, tin cans, iron barrels and materials therefor, and other metal packages.....		8,037,467
All other materials.....		25,988,276

Of the seven fields from which crude petroleum was secured during 1909, the largest producer was the Mid-Continent field, from which 42,895,051 barrels, or 35.5 per cent of the total output of the country, were obtained in 1909. The Illinois field was next in importance, furnishing 21.7 per cent of the total, while the Appalachian field furnished 20.4 per cent and the California field 11.2 per cent.

The total quantity of crude petroleum produced in 1909, according to the statistics of the census, was 171,559,394 barrels, its value at the well being \$117,696,529. In that year 120,775,439 barrels of crude petroleum was used as material in the refineries, being equal to 70.4 per cent of the total production.

The cost per barrel of crude petroleum from the different fields, as computed from Table 14, varies considerably, ranging from 75 cents in California and 98 cents in the Mid-Continent fields to \$1.38 in Illinois and \$1.94 in Pennsylvania. This variation is due largely to differences in the chemical composition of the oil and its physical freedom from foreign substances. The average cost per barrel for the entire country was \$1.26.

At censuses previous to 1909 only the quantity and cost of crude petroleum for the country as a whole and the cost of the other materials used was reported. These totals for 1909, 1904, and 1899, together with the percentages of increase from 1899 to 1909, are given in the following table:

	1909	1904	1899	Percent of increase: 1899-1909
Total cost	\$199,273,402	\$139,387,213	\$102,859,341	83.7
Crude petroleum:				
Barrels (42 gallons).....	120,775,439	66,982,862	52,011,005	132.2
Cost.....	\$152,307,040	\$107,487,091	\$80,424,207	89.4
Fuel and power.....	\$8,376,383	\$5,139,934	\$3,120,441	168.4
Acids.....	4,003,198	2,304,635	1,735,782	130.6
Coopers' and carpenters' materials, barrels, and other wooden packages.....	8,937,421	17,870,348	11,151,733	52.2
Tinners' materials, tin cans, iron barrels and materials therefor, and other metal packages.....	8,037,467			
All other materials.....	17,611,893	6,585,205	6,427,178	174.0

¹ In 1909, 48,580 tons of sulphuric acid, and in 1904, 49,379 tons, were made in the establishments where used. The quantity thus made was not reported for 1899.

The total cost of all materials used in the industry increased 93.7 per cent during the decade ending with 1909. The cost of crude petroleum alone increased 89.4 per cent, while the quantity used showed a gain of 132.2 per cent, thus indicating that there was a considerable decrease in the average cost per barrel. This is, no doubt, occasioned by the fact that the inferior western oils comprised a much larger proportion of the total amount used in 1909.

Products.—Table 16 shows the quantities and values of the different products reported for 1909, 1904, and 1899, also the percentages of increase from 1899 to 1909.

PRODUCT.	1909	1904	1899	Percent of increase: 1899-1909
Total value	\$236,997,659	\$175,005,320	\$123,929,384	81.2
Oils:				
Illuminating—				
Barrels (50 gallons).....	33,495,798	27,135,094	25,171,289	33.1
Value.....	\$94,547,010	\$91,366,434	\$74,694,297	26.6
Fuel oil (including gas oil)—				
Barrel (50 gallons).....	34,034,577	7,209,428	6,095,224	458.4
Value.....	\$36,462,883	\$9,205,391	\$7,550,664	382.9
Lubricating—				
Barrel (50 gallons).....	10,745,885	6,298,251	3,408,918	215.2
Value.....	\$38,884,236	\$23,553,091	\$10,897,214	256.8
Paraffin—				
Barrels.....	3,239,230	1,644,400	1,606,783	101.6
Value.....	\$9,473,975	\$6,210,279	\$3,987,037	137.6
Reduced—				
Barrels.....	2,564,812	2,783,148	676,163	279.3
Value.....	\$4,994,843	\$6,068,360	\$1,669,287	199.2
Neutral—				
Barrels.....	614,884	504,042	608,185	1.1
Value.....	\$2,255,924	\$1,942,153	\$2,256,626	(?)
Cylinder—				
Barrels.....	1,587,579	1,366,661	517,787	206.6
Value.....	\$9,482,568	\$9,332,299	\$2,984,264	217.8
All other—				
Barrels.....	2,739,380			
Value.....	\$12,676,926			
Naphtha and gasoline (including gas naphtha)—				
Barrels (50 gallons).....	10,806,550	5,811,289	5,615,554	92.4
Value.....	\$39,771,959	\$21,314,837	\$15,991,742	148.7
Paraffin wax:				
Barrels (50 gallons).....	946,830	794,068	774,924	22.2
Value.....	\$9,388,812	\$10,007,274	\$7,791,149	20.5
Oil asphaltum:				
Tons (2,000 pounds).....	233,328	(⁸)	(⁸)	
Value.....	\$2,724,752	(⁸)	(⁸)	
Residuum or tar:				
Barrels (50 gallons).....	1,787,008	3,187,921	596,615	199.5
Value.....	\$2,215,623	\$3,138,361	\$688,455	221.8
Greases (lubricating, etc.):				
Barrels (50 gallons).....	138,302	202,439	572,140	-75.8
Value.....	\$1,567,647	\$1,394,130	\$2,454,617	-36.1
Coke and black naphtha.....	\$507,695	\$149,653	\$176,281	188.0
Sludge acid:				
Tons (2,000 pounds).....	133,215	165,104	(¹)	
Value.....	\$402,295	\$400,480	(¹)	
All other products.....	\$10,524,747	\$14,475,669	\$3,684,965	186.6

¹ A minus sign (—) denotes decrease.

² Decrease of less than one-tenth of 1 per cent.

⁸ Not reported separately.

The combined value of illuminating oils, naphtha and gasoline, lubricating oils, and fuel oil was \$209,666,088, or 88.5 per cent of the total value of products of the industry. Illuminating oil was by far the most important product in 1909 as measured by value, but was second in respect to quantity. Fuel oils, of which 34,034,577 barrels were reported, ranked first in quantity and fourth in value. Naphtha and gasoline ranked second in value and third in quantity.

Most of the products showed large percentages of increase from 1899 to 1909 both in quantity and in value. The largest gain was in the case of fuel oil, which increased 27,939,353 barrels, or 458.4 per cent

in quantity, and \$28,912,219, or 382.9 per cent, in value during the decade. The production of lubricating oils increased 215.2 per cent in quantity and 256.8 per cent in value. At censuses previous to 1909 all the different lubricating oils were included under the four kinds of such oils named in the table. At the census of 1909, however, lubricating oils not properly belonging to either of the four classes named were grouped together under the separate classification "all other" lubricating oils.

Illuminating oils, fuel oil, reduced lubricating oil, and paraffin wax show a greater percentage of increase in quantity than in value, but in the case of naphtha and gasoline and of paraffin lubricating oil the value increased much more than the quantity. Grease was

the only product of the industry for which a decrease was shown in quantity. The value of distillates and of separated acid produced is included in the total for "all other products."

It is impossible to give statistics by states concerning the quantity of crude petroleum obtained from different fields or for the quantities of the different products without disclosing the operations of individual establishments. Table 17, however, shows for the United States and for the leading states, what proportion of the crude oil used in the petroleum refineries in 1909 was obtained from each of the several producing fields, and also the ratio (expressed in percentages) between the quantity of crude oil used and the respective quantities of the principal products.

Table 17

STATE.	PER CENT OF CRUDE PETROLEUM OBTAINED FROM THE FIELDS OF--							PER CENT PRINCIPAL PRODUCTS ARE OF TOTAL PETROLEUM USED.						
	Pennsylvania, including Kentucky.	Lima-Indiana.	Illinois.	Mid-Continent (Kansas and Oklahoma).	Gulf (Texas and Louisiana).	Colorado.	California.	Illuminating oils.	Fuel oils.	Residuum or tar.	Lubricating oils.	Naphtha and gasoline.	Paraffin wax.	Greases.
United States.....	20.3	6.7	21.7	35.5	4.4	0.3	11.2	33.0	33.5	1.8	10.6	10.7	0.9	0.1
California.....							100.0	15.3	34.7	1.1	1.6	5.6		0.1
Kansas.....				100.0				20.6	60.7	0.5	2.4	11.4	0.1	0.1
Ohio.....	5.3	49.9	44.8					29.7	31.0	2.5	13.4	13.3	1.3	0.4
Oklahoma.....				100.0				27.1	45.2	4.8	1.4	13.8		
Pennsylvania.....	58.7		23.8	12.0	5.6			47.1	14.7	0.2	17.0	11.2	1.8	0.1

In the United States the quantity of illuminating oils obtained was equal to 33 per cent of the quantity of crude petroleum used; that of fuel oil, to 33.5 per cent; that of lubricating oil, to 10.6 per cent; that of naphtha and gasoline, to 10.7 per cent; and that of other products, to 2.8 per cent. The table shows considerable variation in the proportion of the different products obtained from the oil used by refineries in the various states. For instance, the refineries in California, which used oil solely from the California field, obtained illuminating oil equal to 15.3 per cent of the quantity of crude oil; fuel oil, 34.7 per cent, and lubricating oil, 1.6 per cent; while for the refineries of Pennsylvania, using principally oil from Pennsylvania and

Illinois, the ratios were: Illuminating oil, 47.1 per cent; fuel oil, 14.7 per cent; and lubricating oil, 17 per cent.

Exports of petroleum products.—Table 18 shows for 1880, 1890, and for each year from 1900 to 1910, inclusive, the production of crude petroleum in the country, and the quantity and value of the several petroleum products exported. In order to present figures showing the total production of crude petroleum for years corresponding with those given for exports in Table 18, it was necessary to obtain the same from the reports of the United States Geological Survey, which bureau secures annual statistics of such products.

Table 18

YEAR ENDING DECEMBER 31—	Total production of crude petroleum (barrels, 42 gallons).	EXPORTS OF PETROLEUM PRODUCTS. ¹												
		Total.		Crude oil, including all natural oils without regard to gravity.		Refined or manufactured.						Residuum tar, pitch, and all other from which light bodies have been distilled.		Paraffin and paraffin wax (value).
		Barrels (50 gallons).	Value.	Barrels (50 gallons).	Value.	Naphthas, benzene, gasoline, etc.		Illuminating oil.		Lubricating and heavy paraffin oil.		Barrels (50 gallons).	Value.	
1910.....	209,556,048	30,049,839	\$94,107,022	3,602,223	\$5,404,253	2,013,908	\$8,407,102	18,804,941	\$55,642,368	3,276,651	\$20,921,103	2,352,116	\$3,732,196	\$7,329,143
1909.....	183,170,874	31,382,067	103,838,690	3,406,755	6,027,588	1,375,173	5,799,994	20,928,021	67,814,406	3,232,792	20,016,107	2,439,326	4,180,495	7,608,624
1908.....	178,527,355	30,948,052	108,815,455	2,983,800	6,519,849	877,741	4,542,551	22,580,097	75,988,256	2,955,380	18,971,436	1,651,034	2,793,363	6,922,638
1907.....	166,095,335	25,893,279	91,383,064	2,526,031	6,333,715	692,710	3,676,206	18,118,486	59,635,208	3,040,557	19,210,353	1,515,495	2,527,582	10,209,448
1906.....	126,493,936	25,395,552	85,738,868	2,960,906	7,731,226	550,899	2,488,401	17,565,482	54,858,312	3,025,370	18,689,622	1,292,895	1,971,305	8,462,504
1905.....	134,717,580	24,410,272	79,640,929	2,523,703	6,085,592	568,399	2,214,609	17,629,088	54,900,649	2,274,604	14,312,383	1,414,558	2,127,696	7,872,771
1904.....	117,080,960	20,442,325	80,624,207	2,223,530	6,350,682	499,788	2,321,714	15,227,163	58,384,273	1,793,762	12,393,352	698,082	1,174,156	8,272,856
1903.....	100,461,337	18,733,945	72,628,539	2,530,234	6,782,136	259,463	1,518,541	13,836,744	51,355,668	1,912,439	12,690,065	195,065	282,129	9,596,308
1902.....	88,766,916	21,284,672	68,597,143	2,904,674	6,331,011	393,653	1,392,771	15,576,020	49,079,055	1,644,010	10,872,154	766,315	922,152	8,398,450
1901.....	69,389,194	21,576,050	72,784,886	2,540,160	6,037,544	433,695	1,741,543	16,544,440	53,490,713	1,505,828	10,260,103	551,927	1,254,983	7,959,991
1900.....	63,620,529	19,737,129	74,493,707	2,763,223	7,340,749	371,410	1,681,201	14,783,269	54,692,872	1,424,227	9,933,548	395,000	845,337	8,185,518
1890.....	45,822,672	13,876,597	52,270,953	1,931,453	6,535,499	249,253	1,050,613	11,017,468	39,826,086	641,811	4,766,850	36,612	91,905	2,920,262
1880.....	26,286,123	6,935,788	34,505,645	734,962	2,772,400	302,302	1,344,529	5,722,611	29,047,908	112,360	1,141,825	63,553	198,983	(*)

¹ Compiled from reports on Commerce and Finance, Bureau of Foreign and Domestic Commerce, Department of Commerce.

² Not reported separately.

Exports of petroleum products have, with a few exceptions, increased each year. Nearly two-thirds of the total amount of petroleum products exported in 1910 consisted of illuminating oils. The grouping of the products shown in Table 18 does not correspond exactly with the grouping given in Table 17, but, taken in conjunction with Table 16, it nevertheless affords a fair comparison of production with exports. It is impracticable to determine what proportion of the total petroleum products are exported, but Table 19 gives, for 1909, 1904, and 1899, the percentage that the exports formed of the total output of each of the three main groups of products.

CENSUS YEAR.	PER CENT EXPORTED OF TOTAL PRODUCTION.		
	Naptha, benzine, gasoline, etc.	Illuminat-ing oils.	Lubricat-ing and heavy par-affin oil.
1909.....	12.7	62.5	30.1
1904.....	8.6	56.1	28.5
1899.....	6.4	57.6	40.7

Equipment.—In addition to the statistics of materials and products, the special schedule used for the

petroleum industry called for information in regard to the equipment of the different refineries. The statistics on this subject are summarized in Table 20.

	1909	1904	1899
Stills, number.....	2,395	1,907	1,774
Heated by steam—			
Number.....	451	282	290
Capacity (barrels, 42 gallons).....	424,564	(1)	(1)
Heated by superheated steam—			
Number.....	16	15	26
Capacity (barrels, 42 gallons).....	6,200	(1)	(1)
Heated by fire—			
Number.....	1,928	1,610	1,458
Capacity (barrels, 42 gallons).....	1,656,534	(1)	(1)
Agitators, number.....	529	374	327
Chilling houses for paraffin, number.....	79	67	48
Hydraulic or other presses, number.....	357	311	510
Storage tanks for crude petroleum:			
Number.....	678	304	275
Capacity, gallons.....	242,590,505	245,760,493	(1)
Storage tanks for refined petroleum:			
Number.....	6,476	3,575	2,869
Capacity, gallons.....	1,041,627,444	576,458,825	(1)
Cooper shops, number.....	53	64	48
Tin shops, number.....	14	17	13

¹ Not reported.

DETAILED STATE TABLE.

The principal statistics secured by the census inquiry concerning petroleum refining for 1909 are presented, by states, in Table 21.

PETROLEUM, REFINING—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.						WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horse-power.			
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.		Total.	16 and over.			Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.	Female.		Male.	Female.	
								Maximum month.							Minimum month.
United States.....	147	16,640	42	629	1,820	220	13,929	No 15,249	Mh 12,952	14,873	14,657	170	46	30,268	
California.....	29	1,146	4	66	119	27	930	No 974	Mh 862	948	947	1	.....	5,630
Kansas.....	18	464	.....	51	69	20	324	No 348	Ja 300	360	356	3	1	1,150
Ohio.....	10	2,039	.....	42	293	45	1,659	No 1,943	My 1,500	1,890	1,866	18	6	4,324
Oklahoma.....	9	129	2	20	31	1	75	Oc 92	My 63	91	91	.....	.....	231
Pennsylvania.....	41	3,423	36	123	323	41	2,900	Oc 3,381	Mh 2,535	3,310	3,278	13	19	35,212	
All other states ¹ ..	40	9,439	.....	327	985	86	8,041	.....	.....	8,274	8,119	135	20	43,721

STATE.	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
United States.....	\$181,918,205	\$222,477,636	\$2,010,791	\$1,918,076	\$8,830,078	\$8,378,383	\$180,897,019	\$56,518	\$875,884	\$118,610	\$8,383,277	\$238,997,659	\$37,724,257
California.....	13,880,760	15,812,573	211,843	155,643	800,504	1,190,787	12,716,934	20,406	62,137	280	664,039	17,873,006	3,980,285
Kansas.....	5,020,765	3,379,341	83,602	61,639	186,463	111,793	2,704,917	264	26,568	.....	210,095	4,077,225	1,260,515
Ohio.....	11,152,443	10,042,159	156,675	255,175	1,028,304	522,595	7,621,988	9,436	100,092	4,025	343,869	10,763,738	2,609,155
Oklahoma.....	1,056,682	887,617	30,796	25,993	54,011	31,176	544,297	250	3,670	2,184	195,240	1,055,011	478,538
Pennsylvania.....	38,989,833	51,476,176	418,130	350,226	1,861,405	1,803,713	45,636,603	12,323	55,520	5,767	1,332,489	53,088,199	5,647,883
All other states ¹ ..	111,815,922	140,879,770	1,109,745	1,069,400	5,899,391	4,726,319	121,672,280	13,839	633,897	107,354	5,647,545	150,145,480	23,746,881

¹ All other states embrace: Colorado, 4 establishments; Illinois, 7; Indiana, 1; Kentucky, 1; Louisiana, 2; Maryland, 2; Missouri, 1; New Jersey, 6; New York, 7; Texas, 8; West Virginia, 1.

SOAP

THE SOAP INDUSTRY.

GENERAL STATISTICS.

Scope of the industry.—The statistics presented in this report relate to establishments engaged primarily in the manufacture of soaps and cleansing preparations of the various kinds, and glycerin. In addition to the soap manufactured in establishments classified as in the soap industry, considerable quantities of these products were reported by establishments engaged primarily in the manufacture of chemicals, grease and tallow, cottonseed oil, and "oil, not elsewhere specified." The soap products of these latter establishments are shown in Table 17. Separate reports were secured for the soap departments of the important slaughtering and meat-packing plants, such departments being treated as individual establishments in the soap industry.

Table 1 presents a summary of the statistics for the soap industry for 1909 and 1904.

	1909	1904	Per cent of increase: ¹ 1904-1909
Number of establishments	420	436	-3.7
Persons engaged in the industry.....	18,393	14,501	26.8
Proprietors and firm members	329	399	-17.5
Salaried employees	5,065	3,058	65.6
Wage earners (average number)	12,999	11,044	17.7
Primary horsepower	28,360	20,228	40.2
Capital	\$71,951,109	\$54,816,301	31.3
Expenses	98,226,337	62,117,002	58.1
Services	11,732,431	8,265,248	41.9
Salaries	5,505,549	3,502,572	57.2
Wages	6,226,882	4,762,676	30.7
Materials	72,179,418	43,625,608	65.5
Miscellaneous	14,314,488	10,226,146	40.0
Value of products	111,357,777	68,274,700	63.1
Value added by manufacture (value of products less cost of materials).....	39,178,359	24,649,092	58.9

¹ A minus sign (-) denotes decrease.

Over 18,000 persons were engaged in the soap industry in 1909, practically 13,000 of this number being wage earners. Proprietors and firm members were comparatively few. The 420 establishments in the industry together reported products to the value of \$111,357,777, and expenses amounting to \$98,226,337. The figures for 1909 in the table show the following increases over those for 1904: In persons engaged in the industry, 26.8 per cent; in wage earners, 17.7 per cent; in value of products, 63.1 per cent; and in expenses, 58.1 per cent. There was a decrease of 17.5 per cent in the number of proprietors and firm members and of 3.7 per cent in the number of establishments.

At censuses prior to 1904 the statistics relating to the manufacture of soap were combined under one head with those relating to the production of candles. In

Table 2 is presented a summary of the statistics for the two industries combined for each census from 1859 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	436	13,638	\$6,473,172	\$74,355,520	\$114,488,298	\$40,132,778
1904.....	453	11,860	5,056,611	46,536,823	72,164,062	25,627,239
1899.....	558	9,487	3,764,767	33,143,230	53,231,017	20,087,787
1889.....	578	7,821	3,416,854	28,687,412	43,600,285	14,912,873
1879.....	629	5,289	2,219,513	19,907,444	26,552,627	6,645,183
1869.....	618	4,471	1,944,331	15,268,847	22,624,612	7,355,765
1859.....	620	3,464	1,129,678	13,413,609	19,611,374	6,197,765

Although the number of establishments decreased between 1859 and 1909, the combined industry has shown a constant and decided increase in importance from census to census. It should be noted, however, that this development was due largely to the growing importance of the soap-making branch of the industry. The manufacture of candles as a distinct industry or in connection with soap making is becoming less important, since large quantities are now made by establishments engaged primarily in refining petroleum.

Summary, by states.—Table 3 gives the more important statistics for the soap industry, by states, the states being arranged according to the value of products reported for 1909. Some states for which data can not be shown separately ranked higher than some named in the table.

The soap industry is fairly well distributed throughout the United States, establishments being reported from 35 states and from the District of Columbia. Notwithstanding the number of states reporting the manufacture of soap, the industry is largely centralized, the 4 leading states in 1909, New York, Illinois, Ohio, and New Jersey, together reporting 65.6 per cent of the total number of wage earners, 67 per cent of the value of products, and 66.8 per cent of the value added by manufacture. New York is the most important state in the industry, ranking first at the census of 1909 in number of establishments, average number of wage earners, value of products, and value added by manufacture. In 1909 this state reported soap products to

the value of \$23,582,977, or 21.2 per cent of the total for the United States. Between 1904 and 1909 the value of products in New York increased 76 per cent, and the number of wage earners 23.9 per cent. Although Illinois fell from first rank in value of products in 1904 to second place in 1909, it nevertheless

reported a gain of 42.6 per cent in that item for the five-year period. A slightly larger gain (44.8 per cent) was reported for Ohio, which held third rank at both censuses. The largest relative increase in value of products reported by any state for the period 1904-1909 was 240.3 per cent by New Jersey.

STATE.	Number of establishments: 1909	WAGE EARNERS.				VALUE OF PRODUCTS.				VALUE ADDED BY MANUFACTURE.				PER CENT OF INCREASE. ¹		
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number): 1904-1909	Value of products: 1904-1909	Value added by manufacture: 1904-1909
				1909	1904			1909	1904			1909	1904			
United States.....	420	12,999	100.0	.....	.....	\$111,357,777	100.0	.....	.....	\$39,178,359	100.0	.....	.....	17.7	63.1	58.9
New York.....	67	2,976	22.9	1	1	23,582,977	21.2	1	2	7,970,595	20.3	1	1	23.9	76.0	59.7
Illinois.....	34	2,188	16.8	2	2	20,180,799	18.2	2	1	6,232,639	15.9	3	2	14.9	42.6	29.5
Ohio.....	44	1,774	13.6	3	3	17,077,308	15.3	4	3	5,416,278	13.8	4	3	.....	44.8	59.5
New Jersey.....	21	1,599	12.3	4	5	13,673,942	12.3	4	5	6,589,776	16.8	2	5	158.3	240.3	233.7
Pennsylvania.....	59	1,197	9.2	5	4	9,124,356	8.2	5	4	3,177,553	8.1	5	4	1.1	31.1	9.4
Missouri.....	10	554	4.3	6	6	4,719,352	4.2	7	7	1,664,653	4.2	8	6	1.1	51.6	34.0
Massachusetts.....	38	458	3.5	8	7	4,282,566	3.8	8	7	1,905,968	4.9	6	7	0.7	70.3	82.7
Wisconsin.....	16	213	1.6	10	12	1,610,688	1.5	9	11	700,783	1.8	10	11	13.9	60.8	90.0
California.....	23	166	1.3	12	8	1,576,021	1.4	10	8	459,509	1.2	12	9	-24.5	-1.5	-13.5
Connecticut.....	9	260	2.0	9	9	1,527,736	1.4	11	9	795,730	2.0	9	8	28.1	44.0	25.8
Iowa.....	9	150	1.2	13	13	1,382,022	1.2	12	10	471,545	1.2	11	10	9.5	36.3	16.8
Rhode Island.....	9	168	1.3	11	11	1,248,489	1.1	13	12	309,844	0.8	13	13	-12.5	44.1	10.0
Indiana.....	11	126	1.0	14	10	812,683	0.7	15	14	261,164	0.7	15	14	-37.0	23.4	0.8
Michigan.....	8	68	0.5	18	14	535,804	0.5	17	13	181,885	0.5	16	12	-48.1	-33.0	-39.9
Texas.....	5	80	0.6	16	18	387,817	0.3	19	19	94,412	0.2	19	17	.....	138.0	.....
Georgia.....	3	74	0.6	17	21	330,368	0.3	20	21	75,957	0.2	20	21	.....	.....	.....
Tennessee.....	5	45	0.3	21	15	222,160	0.2	21	15	97,566	0.1	23	15	-59.1	-51.4	-55.8
Oregon.....	4	34	0.3	22	20	203,753	0.2	22	20	63,978	0.2	22	20	.....	47.8	.....
Maryland.....	3	46	0.4	20	16	193,437	0.2	23	17	67,593	0.2	21	16	.....	-24.0	36.8
Louisiana.....	5	26	0.2	23	17	132,188	0.1	24	18	43,217	0.1	24	19	.....	-22.4	.....
Colorado.....	3	7	0.1	26	19	50,094	0.1	27	16	28,027	0.1	27	18	.....	-81.1	.....
New Hampshire.....	3	1	(²)	30	25	11,500	(²)	31	29	4,076	(²)	33	28	.....	.....	.....
All other states.....	31	789	6.1	.....	.....	8,491,717	7.6	.....	.....	2,605,611	6.6	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 20. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or less than \$100,000 for value of products or value added by manufacture.

² Less than one-tenth of 1 per cent.

Persons engaged in the industry.—Table 4 shows for 1909 the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	18,393	13,780	4,613
Proprietors and officials.....	963	925	38
Proprietors and firm members.....	329	306	23
Salaried officers of corporations.....	274	265	9
Superintendents and managers.....	360	354	6
Clerks.....	4,431	3,269	1,162
Wage earners (average number).....	12,999	9,586	3,413
16 years of age and over.....	12,664	9,429	3,236
Under 16 years of age.....	335	157	178

The average number of persons engaged in the soap industry during 1909 was 18,393, of whom 12,999, or 70.7 per cent, were wage earners, 963, or 5.2 per cent,

proprietors and officials, and 4,431, or 24.1 per cent, were clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 74.9 per cent were males and 25.1 per cent were females; less than 2 per cent of the total were children.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 20. The distribution of the average number by sex and age is not shown for the individual states, but Table 21 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported as employed in 27 states; the largest number reported for any state was 680 for New York, and the next largest number, 597, for Illinois. Wage earners under 16 years of age were reported from 17 states, the largest number, 131, being reported from Illinois.

In order to compare the distribution of the persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 5.

Table 5

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				Per cent of increase: ¹ 1904-1909
	1909		1904		
	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	
Total	13,393	100.0	14,501	100.0	28.8
Proprietors and firm members.....	329	1.8	399	2.8	-17.5
Salaried employees.....	5,065	27.5	3,058	21.1	65.6
Wage earners (average number).....	12,999	70.7	11,044	78.2	17.7
16 years of age and over.....	12,664	68.9	10,709	73.9	18.3
Male.....	9,429	61.3	7,612	51.8	25.5
Female.....	3,235	17.6	3,197	22.0	-1.2
Under 16 years of age.....	335	1.9	335	2.3	-0.3

¹ A minus sign (-) denotes decrease.

During the five-year period 1904-1909, the number of salaried employees increased at a much higher

rate than that of either of the other classes of those engaged in the industry, the proportion which they formed of the total increasing from 21.1 per cent to 27.5 per cent. The proportion represented by wage earners, on the other hand, decreased from 76.2 per cent to 70.7 per cent. The proportion which male wage earners 16 years of age and over formed of the total wage earners increased from 68 to 72.5 per cent, while the proportion represented by female wage earners decreased from 28.9 per cent to 24.9 per cent.

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the six states in which an average of 500 or more wage earners were employed during the year.

Table 6

WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	12,999	12,337	12,671	12,885	12,843	12,478	12,653	13,001	13,105	13,250	13,475	13,649	13,650
Illinois.....	2,188	2,093	2,149	2,213	2,140	2,075	2,121	2,192	2,235	2,190	2,248	2,303	2,296
Missouri.....	554	527	545	554	577	655	568	571	549	544	559	545	552
New Jersey.....	1,599	1,387	1,502	1,599	1,620	1,531	1,531	1,578	1,618	1,677	1,713	1,724	1,709
New York.....	2,976	2,895	2,895	2,935	2,949	2,908	2,842	3,004	3,033	3,052	3,050	3,033	3,072
Ohio.....	1,774	1,687	1,707	1,705	1,679	1,628	1,724	1,750	1,786	1,851	1,887	1,931	1,963
Pennsylvania.....	1,197	1,172	1,190	1,193	1,197	1,190	1,194	1,206	1,218	1,228	1,225	1,180	1,173

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the industry during any month of 1909 was 13,650, in December, and the smallest number, 12,337, in January, the minimum number being equal to 90.4 per cent of the maximum. In 1904 the maximum number, 11,515, was reported for November, and the minimum number, 10,661, for July, the latter number being equal to 92.6 per cent of the former.

Prevailing hours of labor.—In Table 7 the wage earners in soap factories have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

More than one-third (36.2 per cent) of the wage earners employed in the industry in 1909 were in establishments where the prevailing number of hours was 60 per week; 45 per cent were employed in establishments where the prevailing hours were 54 but less than 60 per week; and 18.6 per cent were employed in establishments where the prevailing hours were less than 54 per week. There were but 25 reported as employed in establishments where the prevailing hours were more than 60 per week. In Illinois practically all the wage earners were employed 60 hours per week. In Missouri and New York, the most common working time was 54 hours per week; in Ohio, 54 to 60 hours; in New Jersey, 48 to 54 hours; and in Pennsylvania, 48 hours and under.

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of establishments in the soap industry.

Table 7

AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	12,999	635	1,786	1,998	3,849	4,706	23	2
Illinois.....	2,188	8	95	19	49	2,015	.....	2
Missouri.....	554	2	46	310	41	155	.....	.....
New Jersey.....	1,599	3	1,101	202	188	105	.....	.....
New York.....	2,976	20	315	1,152	753	736	.....	.....
Ohio.....	1,774	9	.....	30	1,209	528	.....	.....
Pennsylvania.....	1,197	520	16	19	396	235	11	.....

Table 8

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	420	436	\$111,357,777	\$68,274,700
Individual.....	142	146	5,302,283	4,126,996
Firm.....	77	108	12,117,797	15,487,080
Corporation.....	201	182	93,937,697	48,660,624
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	33.8	33.5	4.8	6.0
Firm.....	18.3	24.8	10.9	22.7
Corporation.....	47.9	41.7	84.4	71.3

In 1909, of the total number of establishments reported for the industry, 47.9 per cent were under

corporate ownership, as compared with 41.7 per cent in 1904. While corporations thus controlled less than one-half of the total number of establishments, the value of the products of these establishments represented 84.4 per cent of the total value of products for the industry in 1909 and 71.3 per cent in 1904.

Table 9 gives statistics for soap factories classified according to form of ownership for each state in which

an average of more than 500 wage earners were employed in 1909.

In 1909, of the total number of wage earners reported for the soap industry, 81.6 per cent were employed in establishments reported as under corporate ownership, 12.2 per cent in establishments under firm ownership, and 6.2 per cent in establishments owned by individuals.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	142	77	201	801	1,591	10,607	\$5,302,283	\$12,117,797	\$93,937,697	\$2,037,007	\$4,327,143	\$32,614,209
Illinois.....	4	6	24	8	50	2,130	23,267	342,506	19,815,026	10,912	147,836	6,073,891
Missouri.....	1	1	8	(X)	(X)	554	(X)	(X)	4,719,352	(X)	(X)	1,664,653
New Jersey.....	6	2	13	119	(X)	1,487	835,295	(X)	12,840,647	511,030	(X)	6,078,746
New York.....	27	9	31	423	310	2,243	2,932,231	1,942,807	18,707,939	963,718	711,531	6,295,346
Ohio.....	11	6	27	56	20	1,698	233,367	104,227	16,739,714	79,515	32,545	5,304,218
Pennsylvania.....	30	19	10	106	910	181	612,948	7,727,616	783,792	207,438	2,699,210	270,905

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

There was considerable variation in the relative importance of the establishments operated by individuals, by firms, and by corporations, respectively, in the different states. Thus in New York, the principal soap-producing state, corporations controlled 46.3 per cent of the total number of establishments, gave employment to 75.4 per cent of the wage earners, and reported 79.3 per cent of the total value of products. In Pennsylvania, on the other hand, corporations operated 16.9 per cent of the establishments, employed 15.1 per cent of the wage earners, and contributed only 8.6 per cent of the total value of products.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

In 1909, 5.2 per cent of the establishments manufactured products valued at \$1,000,000 or over, as against 3 per cent in 1904. While such establishments represented a comparatively small proportion of the total number at both censuses, they reported 69.1 per cent of the total value of products in 1909 and 55.9 per cent in 1904.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	420	436	\$111,357,777	\$68,274,700
Less than \$5,000.....	104	101	253,674	242,459
\$5,000 and less than \$20,000.....	102	103	1,089,754	1,145,523
\$20,000 and less than \$100,000.....	110	140	5,362,689	5,924,974
\$100,000 and less than \$1,000,000..	82	79	27,740,013	22,814,992
\$1,000,000 and over.....	22	13	76,911,647	38,146,452
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	24.8	23.2	0.2	0.4
\$5,000 and less than \$20,000.....	24.3	23.6	1.0	1.7
\$20,000 and less than \$100,000.....	26.2	32.1	4.8	8.7
\$100,000 and less than \$1,000,000..	19.5	18.1	24.9	33.4
\$1,000,000 and over.....	5.2	3.0	69.1	55.9

The average value of products per establishment increased from \$156,593 in 1904 to \$265,138 in 1909, and the average value added by manufacture, as computed from the figures in Table 1, from \$56,535 to \$93,282. The average number of wage earners per establishment increased from 25.3 in 1904 to 30.9 in 1909.

Table 11 classifies the establishments in the six leading states according to the number of wage earners employed.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States..	420	12,393	60	199	480	86	931	38	1,283	17	1,125	18	2,322	8	1,708	5	3,550	1	1,102
Illinois.....	34	2,188	1	17	42	5	41	5	165	1	58	2	322	1	267	2	1,293		
Missouri.....	10	554		4	6			3	117			1	124	1	307				
New Jersey.....	21	1,599	3	6	11	4	47	2	87	3	105	2	290			1	969		
New York.....	67	2,976	8	28	70	15	156	7	192	1	69	5	777	2	610			1	1,102
Ohio.....	44	1,774	6	16	34	11	113	5	167	3	194	1	223	1	265	1	778		
Pennsylvania.....	59	1,197	4	42	119	7	78	2	86	1	100	2	304			1	510		

Of the 420 establishments reported in 1909, 11.9 per cent employed no wage earners; 67.9 per cent employed from 1 to 20; 13.1 per cent employed from 21 to 100; and 7.1 per cent employed more than 100. There were only 12 establishments that employed more than 250 wage earners, and of these only 1 establishment employed over 1,000.

Of the total number of wage earners reported, 10.9 per cent were reported by establishments employing from 1 to 20, 18.5 per cent by establishments employing 21 to 100, and 70.6 per cent by establishments employing more than 100.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expense which were reported. Table 1 shows the total expenses in 1909 to have been \$98,226,337, distributed as follows: Cost of materials, \$72,179,418, or 73.5 per cent; wages, \$6,226,882, or 6.3 per cent; salaries, \$5,505,549, or 5.6 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$14,314,488, or 14.6 per cent. Naturally there are variations in the proportions of total expenses in the several states, owing to differences in the amount of expenditures for advertising and in the kinds of soap produced, the better kinds requiring more expensive materials and probably a higher paid class of labor. The cost of tallow, grease, and other fats and oils constitute the principal item of expense in the cost of materials in this industry.

Engines and power.—Table 12 shows statistics of power used in the soap industry as reported at the censuses of 1909 and 1904.

POWER.	NUMBER OF ENGINES OR MOTORS.		HORSEPOWER.		PER CENT DISTRIBUTION OF HORSEPOWER.	
	1909	1904	1909	1904	1909	1904
Primary power, total . . .	698	524	28,360	20,228	100.0	100.0
Owned.....	465	468	25,038	18,891	88.3	93.4
Steam.....	446	454	24,498	18,747	86.4	92.7
Gas.....	14	11	245	88	0.9	0.4
Water wheels.....	5	3	255	53	0.9	0.3
Other.....			40	3	0.1	0.1
Rented.....	231	56	3,322	1,337	11.7	6.6
Electric.....	231	56	1,974	517	7.0	2.6
Other.....			1,348	820	4.8	4.1
Electric motors.....	1,198	357	12,839	4,410	100.0	100.0
Run by current generated by establishment.....	985	301	10,885	3,893	84.6	88.3
Run by rented power.....	231	56	1,974	517	15.4	11.7

The total primary power used in the soap factories increased from 20,228 horsepower in 1904 to 28,360 horsepower in 1909, or 40.2 per cent. Although steam power increased practically one-third from 1904 to 1909, the proportion which it formed of the total primary power decreased from 92.7 per cent in 1904 to 86.4 per cent in 1909. Rented electric power shows a considerable increase, and its proportion of the total primary power increased from 2.6 per cent in 1904 to 7 per cent in 1909. The horsepower of electric motors used for distributing power by means of current generated in the establishments in the industry also shows a marked increase.

Table 13 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in six of the leading states.

STATE.	PRIMARY HORSEPOWER.								ELECTRIC HORSEPOWER.		FUEL USED.						
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States	317	28,360	25,038	24,498	245	255	40	1,974	1,348	12,839	10,865	55,528	461,206	1,389	1,865	69,347	57,385
Illinois.....	26	5,155	3,199	3,194	5			744	1,212	1,481	737	21	113,638		72	13	3,318
Missouri.....	8	954	855	855				99		281	182		28,114				2
New Jersey.....	16	2,781	2,720	2,720				37	4	1,863	1,826	27,240	21,625	81		1	360
New York.....	49	5,873	5,284	5,277	7			548	41	4,585	4,037	22,441	83,609	80	24		2,049
Ohio.....	38	3,579	3,501	3,472	29			78		2,298	2,220	426	115,220	1,145			35,887
Pennsylvania.....	41	2,598	2,549	2,463	86			44	5	134	90	4,729	24,963	5	87	3	14,353
All other states.....	139	7,440	6,930	6,517	118	255	40	424	86	2,197	1,773	671	74,037	78	1,482	69,330	1,416

In 1909 New York, Illinois, and Ohio together reported 51.5 per cent of the total power used in the industry. Steam was the most important form of power in all of the leading states.

Fuel consumed.—Bituminous coal was the principal fuel used in the soap industry, 461,206 short tons

being consumed in 1909. Gas and oil were also used to some extent, the largest quantity of the former being reported from Ohio. The largest quantity of anthracite coal, 27,240 long tons, or nearly one-half the total for the industry, was reported for New Jersey.

SPECIAL STATISTICS RELATING TO MATERIALS AND PRODUCTS.

Materials.—Table 14 shows statistics for the principal materials used in the industry in 1909 and 1904.

MATERIAL.	1909	1904	Per cent of increase: 1904-1909
Total cost.....	\$72,179,418	\$43,625,608	65.5
Tallow, grease, and other fats:			
Pounds.....	413,969,787	475,613,277	-13.0
Cost.....	\$23,341,905	\$19,723,311	18.3
Coconut and palm-kernel oil:			
Gallons.....	11,856,337	6,833,132	73.5
Cost.....	\$5,875,294	\$2,692,034	118.2
Cottonseed oil:			
Gallons.....	24,221,712	13,276,006	82.4
Cost.....	\$9,718,983	\$3,882,987	150.3
Rosin:			
Pounds.....	207,296,447	168,107,246	23.3
Cost.....	\$4,362,412	\$2,734,848	59.5
Foots:			
Pounds.....	94,050,892	59,761,740	57.4
Cost.....	\$2,453,609	\$1,222,982	100.6
Caustic soda:			
Tons (2,000 pounds).....	52,172	71,551	-27.1
Cost.....	\$2,212,232	\$2,843,888	-22.2
Soda ash:			
Tons (2,000 pounds).....	121,016	53,777	125.0
Cost.....	\$2,281,787	\$1,011,694	125.5
All other materials.....	\$21,933,191	\$9,513,764	130.5

¹ A minus sign (-) denotes decrease.

Each of the materials for which separate statistics are given in Table 14 shows an increase in cost, with the exception of caustic soda, and all but tallow, grease, and other fats and caustic soda show an increase in quantity. The cost of "all other materials" increased 130.5 per cent. The relatively large amount shown for this item is due to the fact that it includes the cost of the principal materials used in the manufacture of cottolene, a secondary product manufactured to a considerable extent by establishments in the soap industry in 1909. It also includes the cost of a considerable proportion of the ingredients used in producing the materials listed in Table 15, as well as the cost of boxes and other containers.

In addition to the materials purchased, as shown in Table 14, considerable quantities of similar materials were produced by establishments in the soap industry and used by these establishments in further processes of manufacture. Table 15 shows the quantities of such materials for 1909 and 1904.

MATERIAL.	MATERIALS MADE IN ESTABLISHMENTS WHERE USED.	
	1909	1904
Red oil.....gallons..	3,175,795	1,149,346
Tallow.....pounds..	17,709,219	10,613,271
Cottonseed oil.....gallons..	2,422,843	920,410
Caustic lye, 30° Baumé.....gallons..	15,931,639	9,568,522
Sodium silicate.....pounds..	37,466,246	1,597,886
Glycerin.....pounds..	5,816,279	3,433,359

The cost of the cotton seed from which the 2,422,843 gallons of cottonseed oil given in Table 15 were manu-

factured was included under the cost of "all other materials" shown in Table 14. Combining the quantity of cottonseed oil shown in Tables 14 and 15 gives a total of 26,644,555 gallons used in the industry in 1909.

Table 16 shows, by states, for 1909 and 1904, the quantity, and for 1909 the cost, of the principal materials for the leading states.

MATERIAL AND STATE.	MATERIALS.		
	1909		1904
	Cost.	Quantity.	Quantity.
Tallow, grease, and other fats	\$23,341,905	Pounds. 413,969,787	Pounds. 475,613,277
Illinois.....	3,225,011	54,546,522	79,134,370
Massachusetts.....	962,642	16,807,002	19,288,432
Missouri.....	809,791	16,978,885	12,381,419
New Jersey.....	2,392,220	41,593,627	33,132,333
New York.....	5,845,965	98,083,852	105,415,189
Ohio.....	3,762,205	76,370,410	108,964,668
Pennsylvania.....	2,394,339	38,897,770	35,546,631
Coconut and palm-kernel oil	5,875,294	Gallons. 11,856,337	Gallons. 6,833,132
Illinois.....	1,084,613	2,174,700	1,009,930
Massachusetts.....	130,314	285,024	175,728
New Jersey.....	183,637	387,676	126,386
New York.....	883,258	1,749,124	812,844
Ohio.....	864,037	1,796,117	818,114
Pennsylvania.....	775,400	1,658,454	946,672
Cottonseed oil	9,718,983	24,221,712	13,276,006
Illinois.....	576,624	1,565,800	8,356,680
Massachusetts.....	42,697	111,141	95,648
New Jersey.....	791,147	2,060,885	122,999
New York.....	1,703,923	4,237,007	1,786,255
Pennsylvania.....	128,419	307,699	185,859
Rosin	4,362,412	Pounds. 207,296,447	Pounds. 168,107,246
Illinois.....	423,829	18,272,898	18,667,593
Massachusetts.....	159,872	7,106,905	4,968,066
Missouri.....	154,351	9,081,412	11,743,615
New Jersey.....	548,945	22,692,182	5,399,357
New York.....	939,230	43,642,265	34,527,676
Ohio.....	508,105	28,173,991	36,323,331
Pennsylvania.....	876,322	41,587,292	20,596,420
Foots	2,453,609	94,050,892	69,761,740
Illinois.....	511,907	13,267,007	13,367,007
Massachusetts.....	118,660	2,028,144	556,547
New York.....	429,904	9,825,800	3,495,053
Ohio.....	226,459	13,658,630	5,954,536
Pennsylvania.....	112,189	1,868,744	1,338,503
Caustic soda	2,212,232	Tons (2,000 pounds). 52,172	Tons (2,000 pounds). 71,551
Illinois.....	335,312	8,022	10,186
Massachusetts.....	110,422	2,397	1,722
New Jersey.....	213,253	5,039	6,526
New York.....	449,716	11,006	13,928
Ohio.....	103,316	2,368	19,311
Pennsylvania.....	352,475	8,708	7,877
Soda ash	2,281,787	121,016	53,777
Illinois.....	288,647	15,640	9,715
Massachusetts.....	47,503	2,603	1,174
New Jersey.....	312,329	17,434	320
New York.....	463,152	24,958	12,648
Ohio.....	458,876	25,128	4,078
Pennsylvania.....	50,216	2,608	3,445

Products.—As previously explained, considerable quantities of soap and other products similar to those made in soap factories were reported by establishments engaged primarily in other industries. Table 17 shows the total quantity and value of all soap products and of glycerin reported as manufactured in 1909 and in 1904 by establishments in the industry and also by establishments in other lines of manufacture.

Table 17

PRODUCT.	Year.	TOTAL.		MADE IN ESTABLISHMENTS ASSIGNED TO THE SOAP INDUSTRY.		MADE IN ESTABLISHMENTS ENGAGED PRIMARILY IN THE MANUFACTURE OF OTHER PRODUCTS.	
		Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.
Total	1899		\$120,417,470		\$111,357,777		\$2,069,683
	1904		72,110,023		88,274,700		3,836,323
Hard soap.....	1909	1,767,165,321	89,829,834	1,736,740,466	88,650,830	30,424,856	1,279,004
	1904	1,386,610,444	58,027,406	1,355,358,649	56,878,486	31,251,795	1,148,920
Soft soap.....	1909	60,036,670	1,269,187	44,052,615	943,676	15,984,055	325,511
	1904	43,899,255	761,081	33,613,416	667,064	10,285,839	94,017
Glycerin.....	1909	81,905,915	11,752,562	139,689,300	6,713,558	242,216,616	6,039,004
	1904	47,537,658	5,401,520	27,660,661	2,958,115	19,876,997	2,443,405
Special soap articles.....	1909		731,823		731,823		
	1904		554,881		554,881		
All other products.....	1909		16,834,064		15,417,890		1,416,174
	1904		7,365,135		7,216,154		148,981

¹ Does not include 5,597,519 pounds, for which no value was reported.

² Does not include 25,319 pounds, for which no value was reported.

The total value of products for the industry in 1909 was \$111,357,777, which includes products other than soap to the value of \$15,417,890. These products consisted principally of food preparations, patent medicines and compounds, chemicals, coffee and spices, and grease and tallow. During the five-year period 1904-1909 the total quantity of hard soaps, including that produced by establishments in the soap industry and as subsidiary products by establishments in other industries, increased 27.4 per cent, and in value 54.8 per cent. The quantity of soft soap increased 36.8 per cent, and the value 66.8 per cent.

In the manufacture of soap considerable quantities of glycerin are liberated of which the manufacturers appear to have imperfect record. The quantity recovered is subject to great variation, dependent not only on the character of the stock used and its treatment in the kettle, but also on the efficiency of the method of recovery employed. In the reports received for 1909, in addition to the quantity of glycerin reported among the products of the industry, it was estimated that 5,622,838 pounds were recovered for which no value was reported. It has been noted (see Table 15) that the quantity of glycerin made for use in the same establishment was 5,816,279 pounds, and Table 17 shows a production of 81,905,915 pounds for which value is reported. It would appear, therefore, that the total production of glycerin in all the manufacturing establishments in 1909, including those in the chemical and other industries, was 93,345,032 pounds. This amount represents an increase of 42,374,015 pounds, or 83.1 per cent over the amount reported in 1904; it should be stated, however, that this increase in the quantity reported is due, in part, to a more thorough canvass of the industry at the later census.

The schedule for the census of 1909 called for the quantity and value of the different classes of hard soap

made during the year. Some of the principal manufacturers could not furnish separate values for the different classes, and there was some confusion due to the fact that the distinction between the different kinds is not clearly marked. The quantities of the different kinds manufactured in 1909 and 1904 are shown for all establishments in the industry in Table 18.

Table 18

KIND.	QUANTITY (POUNDS).	
	1909	1904
Hard soaps:		
Tallow.....	859,297,507	846,753,798
Olein.....	32,832,647	29,363,376
Foats.....	151,063,102	37,804,003
Toilet.....	93,823,149	130,225,417
Powdered, sold as such.....	275,745,585	120,624,968
All other hard soaps.....	323,978,476	190,487,087

Table 19 shows the quantities and values of products of the industry for 1909, and the quantities for 1904.

Table 19

PRODUCT AND STATE.	1909		1904
	Value.	Pounds.	Pounds.
Hard soap	\$88,550,830	1,736,740,466	1,355,358,649
Illinois.....	13,050,220	253,629,401	197,983,351
Massachusetts.....	3,520,453	64,114,050	36,988,239
Missouri.....	4,328,484	93,637,278	69,708,685
New Jersey.....	9,711,659	193,386,889	70,825,669
New York.....	18,094,061	373,529,337	297,377,794
Ohio.....	14,589,331	255,943,442	268,786,287
Pennsylvania.....	8,190,448	167,427,971	140,668,525
Soft soap	843,676	44,052,615	33,613,416
Illinois.....	200,521	7,554,416	567,153
Massachusetts.....	157,966	3,859,144	6,598,116
New Jersey.....	82,614	1,951,919	(1)
New York.....	171,702	14,607,378	16,427,585
Ohio.....	36,449	1,268,533	1,123,100
Pennsylvania.....	120,609	9,690,079	4,202,132
Glycerin	5,713,558	239,689,300	27,660,681
Illinois.....	876,871	6,256,607	3,721,609
Massachusetts.....	144,112	1,143,760	1,355,557
New Jersey.....	635,097	4,765,712	(1)
New York.....	1,212,606	7,913,424	3,432,515
Ohio.....	1,751,070	10,208,289	8,843,638

¹ Figures omitted to avoid disclosure of individual operations.

² In addition, 5,597,519 pounds were reported for which no value was reported.

DETAILED STATE TABLES.

The principal data secured concerning soap factories are presented by states in Tables 20 and 21.

Table 20 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture. Table 21 gives more detailed statistics for 1909 only.

SOAP—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

Table 20 STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.					Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).	Expressed in thousands.							
United States.....	1909	420	18,393	329	5,065	12,999	28,360	\$71,851	\$5,608	\$6,227	\$72,179	\$111,358	\$38,179	
	1904	438	14,501	399	3,058	11,044	20,228	64,818	3,503	4,763	43,628	88,275	24,849	
	¹ 1899	558	12,812	587	2,738	8,487	17,514	38,068	2,777	3,755	33,143	53,231	20,088	
California.....	1909	23	261	27	68	166	477	1,312	111	115	1,117	1,578	459	
	1904	27	319	35	64	220	614	1,409	87	135	1,069	1,600	531	
	1899	35	341	44	53	244	.....	1,403	60	117	1,108	1,595	487
Colorado.....	1909	3	13	1	5	7	89	79	7	5	22	50	28	
	1904	4	41	4	10	27	85	137	15	16	190	264	74	
	1899	3	62	2	10	50	.....	205	17	26	170	242	72
Connecticut.....	1909	9	376	6	110	260	540	971	116	131	732	1,528	796	
	1904	14	260	15	42	203	819	965	73	96	428	1,061	633	
	1899	16	205	14	36	155	.....	599	28	62	334	941	607
Georgia.....	1909	3	108	.....	34	74	123	731	41	23	254	330	78
	1904	3	28	3	8	17	37	49	7	5	47	65	18	
	² 1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois.....	1909	34	3,408	20	1,200	2,188	5,155	11,694	1,356	1,053	13,948	20,181	8,233	
	1904	34	2,497	24	568	1,905	3,519	7,604	640	887	9,345	14,157	4,812	
	1899	39	1,987	38	393	1,556	.....	6,529	453	560	8,083	9,438	3,403
Indiana.....	1909	11	185	4	55	126	366	516	63	54	552	813	261	
	1904	15	244	11	33	200	559	430	35	71	396	659	263	
	1899	13	159	16	22	121	.....	360	24	44	337	526	189
Iowa.....	1909	9	246	6	90	150	270	813	106	58	910	1,382	472	
	1904	7	178	4	35	137	185	478	42	62	610	1,014	404	
	1899	12	152	14	33	105	.....	317	30	38	407	601	194
Louisiana.....	1909	5	40	6	8	26	16	116	8	10	89	132	43	
	1904	4	62	2	12	48	86	139	13	22	105	170	65	
	1899	4	52	2	13	37	.....	147	15	25	118	136	68
Maryland.....	1909	3	67	8	13	46	165	133	9	16	126	193	67	
	1904	4	98	2	22	72	165	170	21	22	148	254	106	
	1899	6	161	2	32	127	.....	209	28	54	169	286	117
Massachusetts.....	1909	38	647	27	162	458	1,379	2,570	232	227	2,377	4,283	1,906	
	1904	36	636	43	138	455	956	1,914	184	205	1,472	2,515	1,043	
	1899	61	741	69	149	523	.....	1,762	156	234	1,609	2,490	881
Michigan.....	1909	8	100	7	25	68	882	551	22	37	354	536	182	
	1904	11	178	6	41	131	477	659	42	55	497	800	303	
	1899	12	178	9	47	122	.....	565	32	49	472	706	234
Missouri.....	1909	10	838	3	281	554	954	2,659	233	272	3,055	4,719	1,664	
	1904	10	706	8	150	548	745	1,844	206	237	1,871	3,113	1,242	
	1899	19	732	20	153	559	.....	2,292	210	232	2,456	3,451	995
New Hampshire.....	1909	3	4	3	.....	1	20	8	.....	1	7	12	5
	1904	7	12	7	.....	5	18	9	.....	2	4	10	6
	1899	13	30	15	1	14	.....	25	1	6	14	34	20
New Jersey.....	1909	21	2,301	10	692	1,599	2,761	8,306	881	796	7,084	13,674	8,590	
	1904	14	775	8	148	619	625	1,719	120	287	2,043	4,018	1,975	
	1899	17	733	16	177	540	.....	1,724	214	208	1,313	2,408	1,095
New York.....	1909	67	3,924	50	898	2,976	5,873	16,708	829	1,486	15,612	23,583	7,971	
	1904	67	3,287	69	816	2,402	4,270	10,603	697	1,043	8,411	13,402	4,991	
	1899	91	2,859	97	742	2,020	.....	7,670	577	821	7,854	12,834	4,980
Ohio.....	1909	44	2,260	25	481	1,774	3,579	12,732	573	827	11,661	17,077	5,416	
	1904	43	2,323	21	528	1,774	3,166	17,985	743	681	8,395	11,791	3,398	
	1899	55	1,840	53	380	1,427	.....	7,856	390	572	5,049	8,150	3,101
Oregon.....	1909	4	40	2	4	34	277	156	5	28	140	204	64	
	1904	3	33	3	6	24	31	110	9	10	86	138	52	
	1899	5	43	3	13	27	.....	89	14	9	83	128	45
Pennsylvania.....	1909	59	1,746	74	475	1,197	2,598	5,428	344	556	5,947	9,124	3,177	
	1904	60	1,460	71	205	1,184	2,152	4,411	253	499	4,054	6,959	2,905	
	1899	60	1,055	78	166	811	.....	2,984	153	295	2,093	3,613	1,520
Rhode Island.....	1909	9	251	5	78	188	402	459	87	70	939	1,248	309	
	1904	8	222	10	20	192	194	383	31	69	585	866	281	
	1899	10	238	11	61	166	.....	398	85	63	550	938	388
Tennessee.....	1909	5	69	4	20	45	105	161	17	14	165	222	57	
	1904	4	152	4	38	110	180	329	39	29	328	457	129	
	1899	6	212	8	37	187	.....	326	31	53	414	546	132
Texas.....	1909	5	114	3	31	80	146	154	34	22	293	388	95	
	1904	8	48	7	6	35	79	134	7	18	89	163	74	
	1899	7	44	6	5	33	.....	72	2	13	77	113	38
Wisconsin.....	1909	18	324	19	92	213	487	812	68	89	910	1,611	701	
	1904	18	238	13	38	187	313	586	52	73	633	1,002	389	
	1899	16	287	13	75	199	.....	724	92	76	725	1,096	371
All other states.....	1909	31	1,051	19	243	789	1,698	4,882	364	389	5,885	8,492	2,607	
	1904	37	708	29	130	649	953	2,769	187	241	2,820	3,797	977	
	1899	59	701	57	160	484	.....	2,052	185	197	1,758	2,911	1,153

¹Includes "candles."²Figures can not be shown without disclosing individual operations.

THE SOAP INDUSTRY.

SOAP—DETAILED STATISTICS, BY STATES: 1909.

Table 21

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.				
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.			
								Maximum month.	Minimum month.								
United States...	420	18,393	329	634	3,269	1,162	12,899	De 13,650	Ja 12,337	13,784	9,998	3,431	167	188	28,380		
California.....	23	261	27	15	45	8	166	No 177	Je 168	171	138	33			477		
Colorado.....	3	13	1	2	2	1	7	Fe ¹ 10	De 0	9					89		
Connecticut.....	9	376	6	11	70	29	260	De 302	My 237	302	183	103	4	12	540		
Georgia.....	3	108		8	23	3	74	Se 88	No 63	72	65	7			123		
Illinois.....	34	3,408	20	75	908	217	2,188	No 2,303	My 2,076	2,399	1,671	597	44	87	5,155		
Indiana.....	11	185	4	11	32	12	126	Jy 143	Ap 114	124	81	37	3	3	366		
Iowa.....	9	246	6	19	61	10	150	Oc 158	Fe 142	151	101	41	3	6	270		
Louisiana.....	5	40	6	4	3	1	26	Ja ¹ 27	Jy ¹ 23	27	26		1		16		
Maryland.....	3	67	8	5	5	3	46	Je 50	Fe 43	47	41	6			165		
Massachusetts.....	38	647	27	37	89	36	458	Oc 489	Je 430	478	359	111	1	7	1,379		
Michigan.....	8	100	7	6	13	6	68	No 71	My ¹ 66	69	56	8	5		882		
Missouri.....	10	838	3	20	231	30	554	Ap 877	Ja 527	564	426	123	1	14	954		
New Hampshire.....	3	4	3					Ja ² 1	Jy ² 1	1	1				20		
New Jersey.....	21	2,301	10	57	409	226	1,599	No 1,724	Ja 1,387	1,708	1,134	532	34	8	2,761		
New York.....	67	3,924	50	157	482	259	2,976	No 3,083	Je 2,842	3,075	2,393	680	2		5,873		
Ohio.....	44	2,280	25	87	323	71	1,774	De 1,953	My 1,628	1,962	1,451	476	16	19	3,579		
Oregon.....	4	40	2	3		1	34	Mh 36	Se 31	33	31	2			277		
Pennsylvania.....	59	1,746	74	27	252	196	1,197	Se 1,226	Ja 1,172	1,174	821	312	27	14	2,598		
Rhode Island.....	9	251	5	9	63	6	168	Se 175	Ja ¹ 164	168	119	39	6	5	402		
Tennessee.....	5	69	4	7	11	2	45	Oc 52	Ja 39	41	28	12	1		105		
Texas.....	5	114	3	4	25	2	80	De 123	Se 67	101	71	20	6	4	146		
Wisconsin.....	16	324	19	14	58	20	213	No 229	Ja 183	216	159	52		5	457		
All other states ²	31	1,051	19	56	164	23	789			892	634	240	14	4	1,696		

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States....	\$71,951,109	\$98,228,337	\$1,652,393	\$3,853,156	\$6,226,882	\$1,285,851	\$70,913,567	\$226,745	\$314,258	\$119,609	\$13,663,876	\$111,357,777	\$39,178,359
California.....	1,312,239	1,458,731	34,800	76,301	115,336	14,980	1,101,532	4,072	7,151		104,559	1,576,021	459,509
Colorado.....	78,968	46,575	4,397	2,760	5,031	644	21,423	180	739		11,401	50,094	28,027
Connecticut.....	970,872	1,343,490	44,110	72,001	130,888	10,093	721,913	1,080	4,495		358,910	1,527,736	795,730
Georgia.....	731,002	387,184	18,070	23,317	23,118	7,375	247,036		1,933		66,335	330,368	75,957
Illinois.....	11,693,653	18,835,398	219,102	1,136,533	1,052,608	262,319	13,685,841	28,660	49,811	19,468	2,381,056	20,180,799	6,232,639
Indiana.....	515,782	781,954	20,240	42,945	54,136	11,719	539,800	2,975	3,250		106,889	812,683	261,164
Iowa.....	812,831	1,186,195	26,300	79,826	58,496	9,808	900,609	180	3,430	2,348	105,168	1,382,022	471,545
Louisiana.....	116,379	118,995	4,773	3,220	9,755	1,554	87,417	1,600	442		10,234	132,188	43,217
Maryland.....	133,269	167,862	4,780	4,056	15,924	3,852	121,992	1,072	804		15,382	193,437	67,593
Massachusetts.....	2,569,777	3,629,441	99,538	132,431	226,324	56,280	2,320,318	14,510	25,687		753,853	4,282,566	1,905,968
Michigan.....	550,882	483,608	6,960	16,066	37,374	7,816	346,103	1,708	2,936		65,645	535,804	181,885
Missouri.....	2,658,565	4,063,898	60,583	171,954	271,640	38,111	3,016,588	6,028	8,940	90,000	400,055	4,719,352	1,664,653
New Hampshire.....	8,345	8,690			750	100	7,324	150	41		325	11,500	4,076
New Jersey.....	8,306,346	11,796,074	342,131	538,739	796,156	110,328	6,973,838	4,210	38,504		2,992,168	13,673,942	6,589,776
New York.....	16,708,332	20,156,635	295,507	533,777	1,435,571	290,146	15,322,236	116,323	62,814	6,825	2,093,436	23,582,977	7,970,595
Ohio.....	12,731,616	14,050,747	186,625	386,553	826,561	222,034	11,438,996	17,279	57,390	843	914,466	17,077,308	5,416,278
Oregon.....	156,151	186,914	4,200	600	25,591	1,408	138,367	3,000	1,186		12,562	203,753	63,978
Pennsylvania.....	5,427,938	8,397,048	55,988	287,566	555,829	64,977	5,881,826	13,858	14,266		1,522,738	9,124,356	3,177,553
Rhode Island.....	458,635	1,184,119	22,510	64,616	70,276	15,533	923,112		4,515		83,557	1,248,489	309,844
Tennessee.....	160,986	216,309	5,650	10,853	13,878	2,158	162,436	38	1,161		20,135	222,160	57,566
Texas.....	153,615	419,866	10,690	23,761	21,614	7,861	285,544	840	1,518	125	67,913	387,817	94,412
Wisconsin.....	811,649	1,480,231	26,025	42,212	89,166	11,649	898,356	4,782	4,078		404,063	1,610,688	700,783
All other states ³	4,883,217	7,826,372	159,414	204,069	390,390	115,146	5,770,960	4,200	19,167		1,163,026	8,491,717	2,605,611

¹ Same number reported for one or more other months.
² Same number reported throughout the year.
³ All other states embrace: Arizona, 1 establishment; District of Columbia, 1; Kansas, 6; Kentucky, 5; Maine, 1; Minnesota, 6; Montana, 1; Nebraska, 2; Nevada, 1; South Carolina, 1; Utah, 1; Vermont, 2; Virginia, 1; Washington, 2.

TURPENTINE AND ROSIN

(677)

TURPENTINE AND ROSIN INDUSTRY.

GENERAL STATISTICS.

Scope of the report.—This report covers the production of commercial spirits of turpentine and rosin by the distillation of the resinous exudation of the pine tree, the crude resin being derived from the longleaf pine (*Pinus palustris*), which is indigenous to a large coastal area stretching from North Carolina to eastern Texas, and, to a less extent, from the Cuban or slash pine (*Pinus heterophylla*) and the loblolly pine (*Pinus taeda*). Similar products, such as "wood spirits," rosin oil, and tar, obtained directly from the pine wood by destructive distillation or by the "steam

process," are not covered by the statistics of production here presented, though small quantities of wood spirits figure in the statistics of turpentine exported.

Comparison with earlier censuses.—Table 1 summarizes the statistics of the turpentine and rosin industry for each census from 1869 to 1909, inclusive.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 1	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	1,585	1,287	1,503	(²) 670	(²) 508	(²) 227	5.5	23.2	-14.4	124.3	31.9	123.8
Persons engaged in the industry.....	44,524	37,526	45,945	(²)	(²)	(²)	-3.1	18.6	-18.3	.....	.....	.....
Proprietors and firm members.....	2,567	1,997	2,192	(²)	(²)	(²)	17.1	28.5	-8.9	.....	.....	.....
Salaried employees.....	2,446	2,147	1,889	(²)	(²)	(²)	29.5	13.9	13.7	.....	.....	.....
Wage earners (average number).....	39,511	33,382	41,864	(²) 15,266	(²) 10,535	(²) 2,638	-5.6	18.4	-20.3	174.2	44.9	299.4
Primary horsepower.....	4,129	1,175	866	(²)	(²)	(²)	376.8	251.4	35.7	.....	.....	.....
Capital.....	\$12,400,978	\$6,961,185	* \$11,847,495	\$4,062,375	\$1,866,390	\$902,225	4.7	78.1	-41.2	191.6	117.7	106.9
Expenses.....	\$19,032,630	\$14,948,573	\$15,834,840	\$5,986,846	(²)	(²)	20.2	27.3	-5.6	164.5	.....	.....
Services.....	\$11,018,750	\$9,534,922	\$9,172,177	\$2,933,491	\$1,623,061	\$476,284	20.1	15.6	4.0	212.7	80.7	240.8
Salaries.....	\$1,655,391	\$1,152,222	\$773,694	(²)	(²)	(²)	112.6	43.7	48.0	.....	.....	.....
Wages.....	\$9,363,359	\$8,382,700	\$3,393,483	(²)	(²)	(²)	11.6	11.7	-0.1	188.8	.....	.....
Materials.....	\$4,910,838	\$3,774,637	\$6,186,492	\$2,874,693	\$2,324,637	\$2,146,090	-20.6	30.1	-39.0	115.2	23.7	8.3
Miscellaneous.....	\$3,103,042	\$1,639,014	\$476,171	\$178,662	(²)	(²)	551.7	89.3	244.2	166.5	.....	.....
Value of products.....	\$25,295,017	\$23,937,024	\$20,344,888	\$9,077,379	\$5,876,983	\$3,585,225	24.3	5.7	17.7	151.9	37.4	63.9
Value added by manufacture (value of products less cost of materials).....	\$20,384,179	\$20,162,387	\$14,158,396	\$5,202,686	\$3,552,346	\$1,439,135	44.0	1.1	42.4	172.1	46.5	146.8
Quantity of principal products:												
Spirits of turpentine (gallons).....	28,988,954	30,687,051	37,733,500	(²)	(²)	(²)	-23.2	-5.5	-18.7	.....	.....	.....
Rosin (barrels of 280 pounds gross).....	3,263,857	3,508,347	4,348,094	(²)	(²)	(²)	-24.9	-7.0	-19.3	.....	.....	.....

¹ A minus sign (-) denotes decrease. Where percentages are omitted comparable figures are not available.

² Comparable figures not available.

* The capital reported for 1899 included timber land, valued at \$5,622,040.

The 1,585 establishments in the turpentine and rosin industry in 1909 gave occupation to 44,524 persons, of whom 39,511 were wage earners. The value of products was \$25,295,017; the cost of materials, however, was only \$4,910,838, or 19.4 per cent of the value of products, the value added by manufacture being \$20,384,179. The relatively small proportion which the cost of materials forms of the value of products in this industry is due to the fact that the principal material is taken directly from the trees by the establishments in the industry and that most establishments reported the cost of gathering this material among the other expenses of the industry and not as a part of the cost of materials. In a certain sense the processes by which the crude gum is obtained from the pine trees are scarcely manufacturing processes, but it is quite impossible in many cases to distinguish the expenses connected with this branch of the business from those connected with the distillation of the gum.

The increase in the five-year period 1904-1909 of 23.2 per cent in the number of establishments and 78.1 per cent in the capital invested is attributable principally to the development of new territory,

especially in the Gulf states, and the building of additional, and as a rule larger, plants. The installation of more expensive apparatus, such as that required for gathering the crude gum by the cup system, was also a factor to some extent in causing an increase in the capital invested. In the value of products there was an increase of only 5.7 per cent between 1904 and 1909, which was due entirely to the higher prices obtained for rosin, as smaller quantities both of turpentine and of rosin were reported in 1909 than in 1904. The number of persons employed, however, and the amounts paid for salaries and wages, materials, and miscellaneous expenses show much larger percentages of increase than the value of products, the decrease in output referred to being the result mainly of temporary and local conditions affecting the production of 1909, such as unfavorable weather for turpentine operations and destructive storms in Mississippi and Louisiana. The largest relative increase in any item of expense, 89.3 per cent, is shown for "miscellaneous expenses" and the smallest, 11.7 per cent, for wages. This is explained in part by the fact that the cost of convict labor was, in most cases, included in salaries and wages in 1904, but was almost uniformly reported under

"miscellaneous expenses" in 1909. In addition, the cost of feed for live stock, which is included under the heading of "miscellaneous expenses," was more fully reported in 1909 than in 1904.

During the five-year period 1899-1904 an increase of 17.7 per cent took place in the value of products; this was due wholly to increased prices, however, as there was a decrease of nearly one-fifth in the output both of turpentine and of rosin. Of the various items of expense some show a large percentage of increase for this period and others a decrease. This is probably due to the fact that some expenses were included under different headings at the two censuses.

While the Bureau of the Census issued no regular report on the turpentine and rosin industry for the years between 1904 and 1909, trade reports, and statistics gathered by the Forest Service of the Department of Agriculture, indicate that considerable development occurred during these years. According to the Forest Service reports the market value of turpentine and rosin produced amounted in 1907 to \$35,600,400 and in 1908 to \$31,895,950. These figures are not strictly comparable with the census figures for 1904 and 1909, however, as they represent the value of the products delivered at the market point, which is considerably greater than the value at the place of manufacture, which constitutes the basis of the census figures.

Development of the industry.—The primitive method of charring wood under sod in kilns or pits to extract tar and pitch was employed by the earlier settlers of the eastern coast of Virginia and the Carolinas. Because the use of tar and pitch at this period was practically restricted to shipbuilding they were called "naval stores," by which term they, as well as spirits of turpentine and rosin, are still known. The process of "bleeding" the longleaf pine, or extracting from it crude resin, was, according to the most authentic available data, first undertaken in North Carolina during the early or middle part of the eighteenth century. Most of the resin thus gathered was shipped abroad to be refined, although a part of it was distilled in some of the larger cities of this country. With the introduction of the copper still in 1834 it became possible to

convert the raw material into commercial spirits of turpentine and rosin near the base of supply, which greatly lessened the cost of manufacture. The output of these products increased rapidly after this, and varied uses for the products developed in the arts and in manufactures. Spirits of turpentine and rosin are now used chiefly as ingredients in such commodities as paint, oil, varnish, soap, paper, rubber, oilcloth, linoleum, sealing wax, fly paper, ink, lubricating compounds, and medicinal preparations. In recent years tar and pitch have come to be of little importance, owing mainly to the diminished demand for them since the general displacement of wooden by iron and steel ships.

At the census of 1810, which was the first to obtain statistics of this industry, 94,900 gallons of "essence of turpentine," valued at \$138,000, were reported, this being the product of 24 stills in North Carolina. The records of the Treasury Department show, however, that as far back as 1790 large quantities of turpentine, rosin, tar, and pitch were being exported each year, and there is evidence of the exportation of such products at a considerably earlier date.

In 1849 the industry was largely confined to the eastern part of North Carolina. This state contained 785 establishments, or 91.7 per cent of the total number in the industry in that year, and its products were valued at \$2,476,252, or 86.7 per cent of the total for the United States. Of the other establishments reported, the majority were in South Carolina, a few being located in Georgia, Florida, Mississippi, Alabama, and Louisiana. Since its early development in North Carolina the industry has gradually extended southward and westward, following the course of the longleaf-pine belt. North Carolina continued to be the leading state in respect to value of turpentine and rosin products until 1879, when it was outranked by South Carolina. In 1889 and 1899, Georgia led in value of products, but at the last two censuses Florida has ranked first and Georgia second.

Summary, by states.—Table 2 presents the more important statistics for 1909 by states and gives also the percentage of increase in the principal items for the two five-year periods between 1899 and 1909 and for the decade.

STATE.	Number of establishments: 1909	WAGE EARNERS.				VALUE OF PRODUCTS.				VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹									
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.		
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
																					1909	1904
United States.....	1,585	39,511	100.0	.....	.....	\$25,295,017	100.0	.....	.....	\$20,384,179	100.0	.....	.....	-5.6	18.4	-20.3	24.3	5.7	17.7	44.0	1.1	42.4
Florida.....	593	18,143	45.9	1	1	11,937,518	47.2	1	1	9,968,450	48.9	1	1	20.4	16.7	3.1	84.5	20.6	53.0	90.0	8.0	74.9
Georgia.....	592	12,787	32.4	2	2	6,938,957	27.4	2	2	5,679,314	27.9	2	2	-33.4	9.0	-38.9	-14.4	-10.0	-5.0	-2.4	-13.3	12.6
Alabama.....	175	3,519	8.9	3	3	2,471,999	9.8	3	3	1,986,207	9.7	3	4	-5.3	20.6	-21.4	21.5	1.6	19.7	43.6	3.3	39.0
Mississippi.....	64	2,573	6.5	4	4	1,474,629	5.8	4	4	1,125,520	5.5	4	3	12.5	-2.3	15.1	-16.8	-37.7	33.5	4.7	-42.9	83.4
Louisiana.....	23	1,688	4.3	5	5	1,173,848	4.6	5	7	1,015,199	5.0	5	6	458.9	615.3	-21.9	920.9	453.8	84.3	.....	480.6	.....
North Carolina.....	79	139	0.4	8	7	673,954	2.7	6	5	191,018	0.9	7	7	-65.2	-6.1	-63.0	-36.2	-9.3	-29.6	-19.7	15.8	-30.7
South Carolina.....	56	443	1.1	6	6	406,286	1.6	7	6	242,500	1.2	6	5	-50.0	162.1	-80.9	-48.5	-29.3	-27.2	-23.7	21.0	-36.9
Texas.....	3	219	0.6	7	.....	217,826	0.9	8	.....	175,971	0.9	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

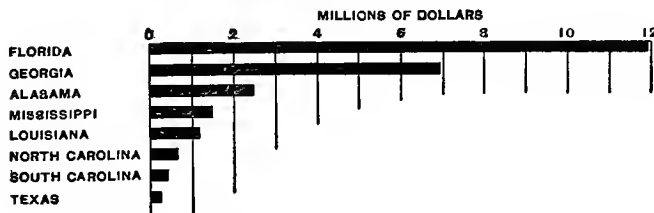
¹ Percentages are based on figures in Table 26. A minus sign (-) denotes decrease. Per cent not shown where base is less than 100 for wage earners, or less than \$100,000 for value of products or value added by manufacture.

The percentages given in the table show conspicuously the decline of the industry in the older turpentine producing states, North Carolina, South Carolina, and Georgia, and its growth in the newer producing territory, Florida, Louisiana, and Alabama. By far the greater part of the increase in the turpentine and rosin industry between 1899 and 1909 took place in Florida, for while Louisiana shows a very high percentage of increase, the value of its products even in 1909 represented only 4.6 per cent of the total. The decline of the industry in North Carolina, South Carolina, and Georgia between 1899 and 1909 was a continuation of a movement which began still earlier.

The value added by manufacture, as already indicated, forms a much larger proportion of the value of products in this than in most other industries. For the United States as a whole it was, in 1909, equal to 80.6 per cent of the total value of products; for Florida the corresponding percentage was 83.5; for Georgia, 81.8; for Alabama, 80.3; for Mississippi, 76.3; for Louisiana, 86.5; for North Carolina, 28.3; for South Carolina, 59.7; and for Texas, 80.8. The low proportions in the case of North and South Carolina are explained by the fact that for practically all of the establishments in North Carolina and for about half of those in South Carolina the total cost of procuring the crude gum, including the wages paid to woodsmen, etc., was reported as cost of materials.

The following diagram shows graphically the value of products reported for each state in 1909:

VALUE OF PRODUCTS OF THE TURPENTINE AND ROSIN INDUSTRY, BY STATES: 1909.



Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the turpentine and rosin industry, classified according to occupational status and sex, and in the case of wage earners according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the industry during 1909 was 44,524, of whom 39,511, or 88.7 per cent, were wage earners, 3,713, or 8.3 per cent, were proprietors and officials, and 1,300, or 2.9 per cent, were clerks, including stenographers and other subordinate salaried employees, this class including the "woods riders," who supervise and keep

account of the work of the woodsmen. Of the total number of persons engaged in the industry, 44,426, or 99.8 per cent, were males and 98, or two-tenths of 1 per cent, were females. Most of the females were either proprietors or firm members, or wage earners, only 4 being reported as clerks. The average number of boys under 16 years of age employed as wage earners was 586.

Table 3

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.		
	Total.	Male.	Female.
All classes.....	44,524	44,426	98
Proprietors and officials.....	3,713	3,683	30
Proprietors and firm members.....	2,567	2,537	30
Salaried officers of corporations.....	86	86	.....
Superintendents and managers.....	1,060	1,060	.....
Clerks.....	1,300	1,296	4
Wage earners (average number).....	39,511	39,447	64
16 years of age and over.....	38,918	38,861	57
Under 16 years of age.....	593	586	7

In addition to the persons shown in Table 3 as engaged in the industry, 1,262 convicts were reported as employed under contract during the year. (See Table 7.) Including these, there were 45,786 persons engaged in the industry during 1909.

The organization of a turpentine farm consists of a manager or superintendent, woods riders and woodsmen, a "stiller" and his helpers, and teamsters. The woodsmen's duties consist in cutting boxes, hanging cups, "chipping," "dipping," "raking," etc., and they work in squads consisting usually of from 10 to 20 men, under the supervision of a woods rider, who directs, inspects, and records the work done. Where establishments are owned by individuals or partners the owners generally manage the place and often do the woods riding.

While experiments have been made from time to time with foreign labor, the negro has proven, thus far, the most practicable workman for this industry. The arduous nature of the work precludes the employment of women and children to any extent.

The average number of wage earners for each state, for 1909, 1904, and 1899, is given in Table 26. The distribution of the average number by sex and age is not shown for the individual states, but Table 27 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported for the representative day from only three of the eight states in which the industry is carried on, and more than four-fifths of the children reported for that day were in two states—Florida and Georgia.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the

classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				Per cent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	44,524	100.0	37,526	100.0	18.8
Proprietors and firm members..	2,587	5.8	1,997	5.3	28.5
Salaried employees.....	2,446	5.5	2,147	5.7	13.9
Wage earners (average number).....	39,511	88.7	33,382	89.0	18.4

Proprietors and firm members show the greatest percentage of increase for the five-year period (28.6). The percentage of increase shown for wage earners (18.4), however, is somewhat below the true figure, owing to the fact that in 1904 some convicts were included among the wage earners, while in 1909 all such laborers were reported separately.

Table 5 shows the average number of wage earners distributed according to age, and in the case of those

16 years of age and over according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	39,511	100.0	33,382	100.0	41,864	100.0
16 years of age and over.....	38,918	98.5	33,253	99.6	41,548	99.2
Male.....	38,861	98.4	33,237	99.6	41,375	98.8
Female.....	57	0.1	16	(¹)	173	0.4
Under 16 years of age.....	593	1.5	129	0.4	316	0.8

¹ Less than one-tenth of 1 per cent.

Wage earners employed, by months.—Table 6 gives the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 for the five states in which an average of 500 or more wage earners were employed during the year.

STATE.	Average number during the year.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	39,511	37,112	37,340	38,488	39,974	40,378	40,555	40,634	40,583	40,378	39,749	39,597	39,343
Alabama.....	3,519	<i>2,831</i>	2,951	3,215	3,682	3,793	3,860	3,840	3,841	3,775	3,733	3,505	3,198
Florida.....	18,143	17,615	<i>17,658</i>	17,722	18,136	18,286	18,355	18,458	18,398	18,370	18,168	18,265	18,387
Georgia.....	12,787	<i>12,288</i>	12,424	12,660	12,943	13,016	13,012	13,000	12,999	12,922	12,766	12,721	12,694
Louisiana.....	1,688	<i>1,407</i>	1,409	1,714	1,771	1,741	1,757	1,814	1,821	1,821	1,651	1,700	1,647
Mississippi.....	2,573	<i>2,447</i>	2,413	2,507	2,625	2,863	2,656	2,608	2,597	2,572	2,586	2,600	2,607

NOTE.—The month of maximum employment for each state is shown by boldface figures and that of minimum employment by italic figures.

The number of employees required by an establishment in the turpentine and rosin industry averages about the same throughout the year, the work being distributed as follows: Cutting boxes or hanging cups in the winter months, chipping and dipping in the spring and summer, and scraping and raking in the fall. This fact is reflected in the decided uniformity in the numbers shown in Table 6 for the several months of the year. In the industry as a whole the largest number of wage earners employed during any month of 1909 was 40,634 in July and the smallest 37,112 in January, the minimum number forming 91.3 per cent of the maximum.

Convict labor.—In two states convict labor was employed in 1909 under contract in the production of turpentine and rosin. Table 7 shows the average number of convicts employed in 1909 and their cost to the operator, including hire and keep.

	Total.	Alabama.	Florida.
Average number of convicts employed.....	1,262	181	1,081
Total paid for convicts, including expense of their keep.....	\$656,822	\$78,126	\$578,696

At previous censuses convicts were included to some extent with other employees, but at the census of 1909

they were reported separately and the amount paid the state under the contracts for their labor and also the expenses of their maintenance were included with "miscellaneous expenses," under the heading of "contract work."

Prevailing hours of labor.—In the census statistics of manufactures wage earners are classified according to the prevailing hours of labor per week, reported on the schedules as the hours normally worked by wage earners in the establishments in which they were employed. In making this classification, as explained in the Introduction, all the wage earners in a given establishment are classified as a group according to the hours prevailing in that establishment, even though some of the employees may have worked a greater or smaller number of hours; in other words, no attempt has been made to take account of variations in hours within the same establishment. For most industries, however, the result is believed to indicate the number of hours actually worked by the great mass of employees, but in the turpentine and rosin industry, where the piece-work system of wage payments is in very general use and the woodsmen usually work irregular hours, the classification on this basis is probably of doubtful significance. The tabulation has nevertheless been made and the results are presented in Table 8.

Table 8

AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	39,511	14,786	2,647	1,022	280	19,607	997	172
Alabama.....	3,519	1,243	187	248	24	1,393	359	65
Florida.....	18,143	8,344	1,983	635	147	6,859	149	26
Georgia.....	12,787	2,764	428	139	109	9,032	241	74
Louisiana.....	1,688	262	.....	.....	.....	1,277	149	.....
Mississippi.....	2,573	1,830	24	.....	.....	621	98	.....

Character of ownership.—Table 9 presents data with respect to the character of ownership of the establishments engaged in this industry.

Of the total number of establishments reported for the industry in 1909, 49.8 per cent were operated by firms, as compared with 48.2 per cent in 1904. The value of the products of such establishments represented 48.2 per cent of the total in 1909 and

52.2 per cent in 1904. Of the total number of wage earners in 1909, 27.9 per cent were employed in establishments operated by individuals, 49 per cent in those operated by firms, and 23.1 per cent in those owned by corporations.

Table 9

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	1,585	1,287	\$25,295,017	\$23,937,024
Individual.....	599	535	6,966,127	7,777,752
Firm.....	790	620	12,184,834	12,498,683
Corporation.....	196	132	6,144,056	3,660,589
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	37.8	41.6	27.5	32.5
Firm.....	49.8	48.2	48.2	52.2
Corporation.....	12.4	10.3	24.3	15.3

1 Includes two establishments under "Other" forms of ownership, to avoid the disclosure of individual operations.

Table 10 gives statistics for establishments classified according to form of ownership for each state in which an average of more than 500 wage earners were employed in 1909.

Table 10

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	599	790	196	11,022	19,359	9,130	\$6,966,127	\$12,184,834	\$6,144,056	\$5,421,756	\$9,813,443	\$5,048,980
Alabama.....	72	78	25	1,073	1,683	763	727,984	1,193,848	550,167	565,496	965,891	454,820
Florida.....	161	342	90	4,255	9,892	3,996	2,657,523	6,451,526	2,828,469	2,218,034	5,384,630	2,385,786
Georgia.....	261	306	25	5,092	6,973	722	2,792,941	3,764,182	381,834	2,273,014	3,099,271	307,029
Louisiana.....	3	8	12	64	209	1,415	26,947	146,427	1,000,474	22,347	124,609	868,243
Mississippi.....	15	22	27	242	388	1,943	159,349	251,589	1,063,691	118,976	197,364	809,180

Considerable variation appears in the relative importance of the establishments operated by individuals, firms, and corporations, respectively, in the different states. Thus in Alabama, Florida, and Georgia firm ownership predominated, more than 50 per cent of both the average number of wage earners and the value of products being reported by firms in the two states last mentioned. In Mississippi and Louisiana, where the industry is of more recent development, establishments operated by corporations gave employment to 75.5 per cent and 83.8 per cent, respectively, of the wage earners and reported 72.1 per cent and 85.2 per cent, respectively, of the value of products. In North Carolina and South Carolina, the states where the industry had its beginning, establishments owned by individuals still constituted the most important class in 1909. In North Carolina they formed 70.9 per cent of all establishments in the industry, employed 66.9 per cent of the wage earners, and reported 63.1 per cent of the total value of products. The corresponding percentages for South Carolina were 55.4, 45.8, and 43.3, respectively.

Establishments classified according to size.—Table 11 presents statistics for 1909 and 1904 for establish-

ments in the industry classified according to the value of their products.

Table 11

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	1,585	1,287	\$25,295,017	\$23,937,024
Less than \$5,000.....	249	143	775,812	424,039
\$5,000 and less than \$20,000.....	971	634	11,216,577	8,552,532
\$20,000 and less than \$100,000.....	355	453	11,618,484	14,029,269
\$100,000 and over.....	10	7	1,684,144	901,184
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	15.7	11.1	3.1	1.8
\$5,000 and less than \$20,000.....	61.3	53.1	44.3	35.9
\$20,000 and less than \$100,000.....	22.4	35.2	45.9	58.6
\$100,000 and over.....	0.6	0.5	6.7	3.8

The table shows a considerable increase in the relative importance of establishments having products valued at \$5,000 but less than \$20,000, and a slight increase in the relative importance of the smallest establishments—those with products valued at less than \$5,000—and of the largest establishments—those which had products valued at \$100,000 or over. The proportion of the smaller establishments—those with products valued at less than \$20,000—was much larger in North Carolina and South Carolina than in the other states.

In some respects, and especially from the standpoint of conditions under which persons engaged in manufacturing work, the best classification of establishments to bring out the feature of size is a classification according to the number of wage earners employed. Table 12 gives such a classification of the establishments in each state for which more than 500 wage earners were reported at the census of 1909.

Of the 1,585 establishments reported, only 19, or 1.2 per cent, employed no wage earners. The largest number of establishments comprised in any group was

that of establishments employing from 6 to 20 wage earners (655, or 41.3 per cent of the total), and the next largest, that of establishments employing from 21 to 50 wage earners (603, or 38 per cent of the total number). Only 1 establishment employed over 500 wage earners, the number reported for this being 655.

Of the total number of wage earners reported, 19,245, or 48.7 per cent, were in establishments employing from 21 to 50, and 9,430, or 23.9 per cent of the total, were in establishments employing from 6 to 20.

Table 12

STATE.	ESTABLISHMENTS EMPLOYING IN 1909—																
	TOTAL.		No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number)		Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.....	1,585	39,511	19	194	468	655	9,430	603	19,245	88	5,673	23	3,487	2	553	1	655
Alabama.....	175	3,519	2	29	92	81	1,147	57	1,824	5	306	1	150	.....	.....	.....	.....
Florida.....	593	18,143	10	18	67	198	3,047	298	9,644	57	3,603	12	1,782	.....	.....	.....	.....
Georgia.....	592	12,787	2	35	134	319	4,515	214	6,620	21	1,414	1	104	.....	.....	.....	.....
Louisiana.....	23	1,688	.....	.....	.....	7	108	9	371	1	86	5	823	1	300	.....	.....
Mississippi.....	64	2,573	2	9	13	27	375	18	591	3	164	3	522	1	253	1	655

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of depreciation, and consequently can not properly be used for determining profits. Facts of interest can, however, be brought out concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$19,032,630, divided as follows: Wages, \$9,363,359, or 49.2 per cent; salaries, \$1,655,391, or 8.7 per cent; materials, \$4,910,838, or 25.8 per cent; and miscellaneous expenses, which include the cost of advertising, ordinary repairs of buildings and machinery, and insurance, traveling expenses, and other sundry expenses, \$3,103,042, or 16.3 per cent. As shown by Table 27, decided differences in the proportions of the several classes of expenses appear among the states. These differences are due chiefly to the fact (already mentioned) that in some states the cost of extracting gum from the trees was quite uniformly reported under the items of wages, salaries, and miscellaneous expenses, while in other states many establishments included the cost of extraction under cost of materials or bought the gum from others.

Engines and power.—The amount of power used in the turpentine and rosin industry was first reported at the census of 1899. Table 13 shows the number of engines or other motors, according to their character, employed in generating power, and their total horsepower, as reported at the censuses of 1909, 1904, and 1899.

Table 13

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	1,214	176	116	4,129	1,175	866	100.0	100.0	100.0
Owned.....	1,214	176	116	4,122	1,175	866	99.8	100.0	100.0
Steam.....	1,152	175	116	3,864	1,128	706	93.6	96.0	81.5
Gas.....	58	.....	.....	231	.....	.....	5.6	.....	.....
Water wheels..	3	1	.....	11	3	.....	0.3	0.3	.....
Water motors..	1	.....	(¹)	3	.....	(¹)	0.1	.....	.....
Other.....	.....	.....	.....	13	44	160	0.3	3.7	18.5
Rented (other than electric).....	.....	.....	.....	7	.....	.....	0.2	.....	.....

¹ Not reported.

This table indicates that the total primary power increased 2,954 horsepower, or 251.4 per cent, from 1904 to 1909, and 309 horsepower, or 35.7 per cent, from 1899 to 1904. Little power is required by this industry, many establishments reporting no mechanical power at all; and where power is employed, a small plant, consisting of a boiler and a steam pump, used in forcing water from a well, stream, or lake to the tank of the still, often provides all that is necessary for the operation of the plant. No electric motors were reported.

Table 14 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the five leading states.

The states in which the largest amount of power was used were Florida and Georgia, which together reported 80.5 per cent of the total for the industry.

STATE.	PRIMARY HORSEPOWER: 1909								FUEL USED: 1909			
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented (other than electric).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.					
United States	1,134	4,129	4,122	3,864	231	14	13	7	515	134,366	621	10,050
Alabama	69	384	384	375	4	5	.....	.....	225	16,310	3	.....
Florida	508	1,916	1,913	1,787	108	5	13	3	250	59,854	237	.....
Georgia	495	1,407	1,407	1,338	65	4	.....	.....	40	39,255	68	50
Louisiana	18	105	105	105	.....	.....	.....	.....	.....	4,882	.....	.....
Mississippi	38	286	286	236	50	.....	.....	.....	.....	7,035	200	10,000
All other states	6	31	27	23	4	.....	.....	4	.....	7,060	13	.....

Fuel consumed.—The principal fuel employed is wood, which is used chiefly in heating the furnace of the still. The quantity reported for 1909 was 134,366 cords, but this amount does not represent all of the wood consumed as fuel, since large quantities were undoubtedly used of which no record was kept. The

value of the wood used is not included in the expenditure for fuel and rent of power, which is shown in Table 27, as it was for the most part cut from land owned or leased by the establishment and no cost was involved, apart from the cutting and hauling, which were done by the regular wage earners.

SPECIAL DATA AS TO PRODUCTS, METHODS OF PRODUCTION, ETC.

Products.—The special schedule used in collecting statistics for the turpentine and rosin industry required a detailed statement of the quantity of crude gum distilled and the quantity and value of the turpentine and rosin produced, and also data in regard

to the timber land controlled and the number of crops worked.

Table 15 shows, by states, for 1909, 1904, and 1899, the quantity and value of the spirits of turpentine and rosin produced and the value of all other products.

TURPENTINE AND ROSIN—PRODUCTS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Total value.	SPIRITS OF TURPENTINE.		ROSIN.		Dross and all other products, value.
			Quantity (gallons).	Value.	Quantity (barrels of 280 pounds).	Value.	
United States	1909	\$25,295,017	28,938,954	\$12,654,228	3,263,857	\$12,576,721	\$84,088
	1904	23,937,024	30,687,051	15,170,499	3,508,347	8,725,619	40,906
	1899	20,344,838	37,733,500	14,960,235	4,348,094	5,129,268	255,335
Alabama	1909	2,471,999	2,840,242	1,253,737	309,763	1,214,054	4,208
	1904	2,434,365	3,108,118	1,501,563	360,469	930,053	2,749
	1899	2,033,705	3,703,900	1,460,582	416,293	490,882	82,241
Florida	1909	11,937,518	13,809,785	5,847,478	1,555,749	6,057,524	32,516
	1904	9,901,905	12,872,869	6,425,826	1,445,902	3,447,418	28,661
	1899	6,469,605	11,838,900	4,800,033	1,310,554	1,539,472	30,100
Georgia	1909	6,938,957	8,056,752	3,556,965	904,103	3,371,676	10,316
	1904	7,705,643	9,542,316	4,795,331	1,104,968	2,901,583	8,729
	1899	8,110,468	15,289,550	6,024,054	1,612,594	2,055,550	30,864
Louisiana	1909	1,173,848	1,231,254	592,641	139,486	573,306	7,901
	1904	211,820	245,300	124,005	30,023	87,715	100
	1899	115,324	215,200	85,415	23,843	27,319	2,590
Mississippi	1909	1,474,629	1,588,786	732,334	192,508	739,799	2,496
	1904	2,365,720	3,160,371	1,473,530	362,835	892,028	162
	1899	1,772,435	3,213,350	1,253,934	409,869	461,165	57,336
North Carolina	1909	673,954	781,197	369,587	83,070	304,232	135
	1904	743,421	993,665	480,198	116,314	263,073	150
	1899	1,055,695	1,994,150	772,772	371,347	271,352	11,571
South Carolina	1909	408,286	460,186	205,517	51,401	199,273	1,496
	1904	574,150	764,412	370,046	87,836	203,749	355
	1899	787,656	1,478,450	563,445	203,593	183,528	40,683
Texas	1909	217,826	220,752	95,969	27,777	116,857	5,000
	1904	.....	.....	.....	.....	.....	.....
	1899	.....	.....	.....	.....	.....	.....

¹ In addition, 682,702 gallons of turpentine, valued at \$243,491, was produced by the process of wood distillation. (See census report on "Forest Products of the United States," 1909.)

The production of turpentine and rosin was reported for seven states in 1899 and 1904 and for eight in 1909, Texas being the added state. At the censuses of 1904 and 1909 Florida was the leading

state in the industry; the output of this state in 1909 was valued at \$11,937,518, or 47.2 per cent of the total value reported for the United States. The state next in rank, on the basis of value of products, was

Georgia, followed by Alabama, Mississippi, Louisiana, North Carolina, South Carolina, and Texas, in the order named.

The total quantity of spirits of turpentine reported in 1909 was 23.2 per cent less than that reported in 1899, and its value 15.4 per cent less. The quantity of rosin reported shows a corresponding decrease of 24.9 per cent, but its value, owing to a marked increase in the price, shows an increase of 145.2 per cent for the decade. The average value of turpentine in 1899 was \$0.396 per gallon; in 1904, \$0.494; and in 1909, \$0.437. The average value of rosin per barrel of 280 pounds gross, as computed from the totals reported, was \$1.18 in 1899, \$2.49 in 1904, and \$3.85 in 1909. The decrease in production throughout the decade was shared by all of the states for which figures are shown in Table 15, except Florida and Louisiana.

The marked decrease in the production of turpentine and rosin in North Carolina and South Carolina during the decade 1899-1909 was the result of the gradual extermination of the pine forests. The few small tracts of pine remaining in those states are for the most part owned by farmers, who box the trees and sell the crude gum to distilleries or to dealers, or else have it distilled on a toll basis.

The decreases in Georgia, which were much more important in point of absolute amount than those in the Carolinas, are also attributable to the working out of the timber. The industry in this state is conducted principally by small operators, many of whom take up new land in the Gulf states as their timber becomes exhausted, or else clear their land and devote their energies to farming or other pursuits.

The increase in production in Florida is the result of the development of new territory, especially in the western part of the state. Florida will probably remain the leading state in this industry for a considerable period, if not indefinitely, for its whole area, with the exception of a small belt in the southern part of the peninsula, is peculiarly adapted to the growth of the resinous pine. The extension of transportation facilities during the past few years has put great tracts of pine forest within easy reach of the markets. The timber is larger and the growth denser in the western than in the eastern and southern sections of the state. While the small operator predominates in Florida, there were 12 establishments in the state in 1909 which gave employment to an average of over 100 wage earners, as shown by Table 12.

Alabama shows for the decade a decrease of about one-fourth in the production both of turpentine and of rosin. The turpentine section of this state has been pretty thoroughly worked, as the industry was of considerable importance there as early as 1860, but much valuable timber still remains in the hands of a few large lumber mill owners and holding companies, who are inclined to restrict their operations when prices are low or other conditions unfavorable.

Mississippi shows a production for 1909 only about half that of 1904, this decline being due largely to two severe storms which swept the timbered section of the state in 1906 and 1909, respectively, doing inestimable damage and forcing many concerns out of business. As transportation facilities have been extended, about half of the available timber in Mississippi has been worked. Most of the remainder has passed, as in Alabama, into the possession of a few lumber mill owners, who work their holdings or not according to market conditions.

Though Louisiana ranked only fifth among the states in the industry in 1909, it has developed very rapidly, particularly during the 10-year period 1899-1909, the increase in the production of turpentine amounting to 472.1 per cent and in that of rosin to 486.3 per cent. The vast forests of longleaf pine in western Louisiana and eastern Texas have never been worked for turpentine until within the last few years. They are controlled principally by large mill owners, who have refused to allow the timber to be boxed, but since the introduction of the cup system many of these owners have either engaged in the turpentine industry themselves or have leased their timber to others.

In 1910 the Bureau of the Census, in response to a demand from certain quarters, instituted what was intended to be an annual census of the production of turpentine and rosin, but the investigations were not continued after that year. The data were collected from naval-stores "factors," who are the middle men between the producers and the buyers, from jobbers, and from a few manufacturers who sell their products direct to the consumers. The difference between this method of collecting the data and that used at the decennial census, when all individual producers were canvassed, possibly renders the statistics for 1910 not wholly comparable with those for 1909. Table 16 gives the statistics for 1910, by states.

STATE.	PRODUCTION: 1910			
	Turpentine.		Rosin.	
	Quantity (gallons).	Value.	Quantity (barrels of 280 pounds).	Value.
United States.....	27,735,700	\$17,680,205	3,404,146	\$18,254,637
Alabama.....	2,350,700	1,514,958	308,805	1,873,408
Florida.....	14,884,500	9,453,632	1,819,313	9,714,240
Georgia.....	6,979,800	4,509,089	868,796	4,636,797
Louisiana and Texas.....	948,500	582,236	82,498	456,315
Mississippi.....	1,736,150	1,088,337	211,875	1,198,850
North Carolina.....	427,050	272,228	53,611	282,596
South Carolina.....	409,000	259,725	59,450	312,431

Equipment and methods of operation.—The manufacture of turpentine and rosin is generally conducted on what is called a "turpentine farm." The farm consists principally of a tract of timber land, in many cases leased by the operator for the turpentine privileges, and is equipped with a still, cooper shop, tools, dip barrels, draft animals, houses and shanties for the

use of employees, etc. The equipment of a farm, exclusive of land or leases, costs from \$5,000 up, the average value being about \$10,000.

There are two chief systems of extracting gum from the trees, called the "box system" and the "cup system." The first step in the gathering of the gum by the box system is the cutting of a box or cavity into the base of the tree by means of an axe, to receive the liquid gum, which is called "dip." The box is usually from 6 to 12 inches wide, about 7 inches deep, and about $3\frac{1}{2}$ inches from front to back; the number cut into a tree varies from one to four, according to the size of the tree. Box cutting usually begins in December and January and lasts until March. This operation is followed by "chipping," which is the wounding or scarifying of the trunk of the tree directly above the box, a strip of bark and sapwood about three-fourths of an inch wide and from one-half to one inch deep being removed from the tree. This work is accomplished by means of a "hack," a specially constructed tool consisting of a sharp steel blade made in the form of the letter U and attached to a stout wooden handle. The first chipping takes place on the upper edge of the wound made by cutting and "cornering" the box. The stroke with the hack is made from either side diagonally downward, terminating in the center and immediately above the box. An exposed surface the width of the box is thus created, which is termed a "face." Chipping begins in March and April and continues at regular intervals for about 32 weeks. The gathering of the gum, the flow of which is continuous throughout the chipping season, begins shortly after the first wound is made and is continued at intervals of two or three weeks. The dip is transferred from the box by means of a flat, trowel-shaped instrument called a "dipper" into buckets and from the buckets into dip barrels placed at convenient intervals in the forest, which when filled are hauled to the still. A season's chipping extends the face of the tree upward a distance of about 24 inches. After a tree has been worked about three seasons the face extends so far up the tree that it becomes necessary to use a "puller," which is an instrument similar to the hack except that it has a long handle.

In flowing to the box a certain proportion of the crude resin coagulates on the face of the tree. This residue, which is called "scrape," is allowed to form undisturbed until toward the end of the season, when the flow of the gum has practically ceased. It is then scraped off and caught in a box placed at the base of the tree, and from that transferred to the still in the same manner as dip.

The "cup system" of gathering the gum differs from the "box system" principally in the kind of receptacle used for collecting the crude gum, a clay or metal cup being substituted for the box cut into the tree itself.

There are two kinds of cup systems in use, one being styled the "cup and gutter system" and the other the "cup and apron system." The fundamental principle of the two is the same, the points of difference consisting in the shape of the cup, the manner of adjusting it to the tree, and the equipment used in directing the gum to the cup. The chipping of the tree begins above the location of the cup and continues upward in the same manner as when the box is used. Either metal gutters or aprons, according to the system used, are inserted into the face of the tree in such a way as to direct the exuded gum into the receptacle. The cup is easily detached from the tree, and its contents emptied into a bucket, the gum being scraped from the bottom and sides of the cup by means of a small paddle.

At the close of the producing season the ground in the woods is carefully burned over in order to destroy the undergrowth, grass, and waste accumulation of the forests. This is done as a precautionary measure against fire. Before the burning takes place all resinous and other trash is cleared away from around the trees for a distance of about 3 feet in order to protect them from the fire, this process being known as "raking."

The gathering of the crude gum is followed by its distillation. The still is a large copper kettle, incased in a brick jacket, and provided with a removable gooseneck cap. Beneath the copper still is a grate, which is large enough to accommodate four-foot wood. In a "charge," which requires from three to five hours for its distillation, the still usually contains from five to eight barrels of dip or scrape. As the still is heated and the vapors pass off, water is added to facilitate the evaporation of the spirits of turpentine and to prevent burning. The mixed vapors of spirits of turpentine and water pass off through the gooseneck into a copper worm surrounded by water, the condensed liquid flowing into a barrel where the water and turpentine separate by gravity. The spirits of turpentine is then transferred into tight white-oak barrels or "casks" of about 50 gallons' capacity, and is ready for shipment. The residue in the kettle after the turpentine has been distilled off is rosin, which, while molten, is drawn from a tap at the lower edge of the kettle into a vat sunk into the ground near the still. In its course from the kettle to the vat it passes through three copper mesh strainers of different degrees of fineness, the last of which is covered with a thin layer of cotton batting. The material accumulated in this cotton batting is called "batting dross." This dross was formerly treated as a waste, being generally burned at the still, but within the last few years there has developed some demand for it for use in certain lines of manufacture. The rosin while hot is ladled from the vat into rough pine barrels, in which it is marketed. These are termed "round" barrels and weigh approximately 510 pounds gross, the weight of the barrel itself being about

90 pounds. Sales are made on this basis, but calculations and settlements are based on the "commercial" barrel, which weighs 280 pounds gross. The statistics of this report deal with the commercial barrel. The amount of rosin obtained per barrel of spirits of turpentine averages from three to three and one-half round barrels, or from five and one-quarter to six commercial barrels.

A tree, as a rule, is worked four years, the boxes of the first season's working being generally referred to as "virgin boxes," those of the second year as "yearling boxes," and those of the fourth or fifth year as "old boxes." After timber has been worked for four, or sometimes five, years it is allowed to "rest" for several years—generally about four—during which time the wounds heal and its vitality is restored so that it is in condition to furnish another yield of gum. Then new boxes are cut (this second working of the tree being termed "back boxing"), and chipping proceeds in the same manner as in the first instance. Such timber is worked the same number of seasons and produces about the same grade of products as "round" timber, or that which is being worked for the first time. Much timber is cut at the end of the first period of operation, the owners estimating its lumber value at this time to be greater than its value for the future production of turpentine.

Crude gum distilled.—The quantity of crude gum distilled in 1909 is shown in Table 17. The quantity is expressed in barrels, but there was a very wide variation in the size of the barrels and it was found impracticable to reduce them to a common standard or an average size. Except for Florida, where barrels for dip and those for scrape were uniformly reported as of a capacity of 500 and 300 pounds, respectively, there was no uniformity in the capacity of barrels of either kind, the dip barrels ranging from 280 to 600 pounds and the scrape barrels from 200 to 400 pounds.

STATE.	Number of establishments.	CRUDE GUM DISTILLED: 1909		Dip and scrape purchased (barrels). ¹
		Dip (barrels).	Scrape (barrels).	
United States	1,585	2,378,903	1,099,788	180,119
Alabama.....	175	236,279	121,286	13,324
Florida.....	593	1,112,195	513,924	2,614
Georgia.....	592	656,736	295,225	13,608
Louisiana.....	23	90,224	43,164	.....
Mississippi.....	64	127,102	62,253	6,669
North Carolina.....	79	101,188	36,237	122,631
South Carolina.....	56	37,479	21,900	21,273
Texas.....	3	15,700	5,800	.....

¹ Included in the totals for crude gum distilled.

The character of crude gum varies according to the age of the box or cut from which it is gathered, or, as it is termed, the age of the crop. The gum obtained the first season after the box is cut or the cup set (from what is termed a virgin crop) produces the largest quantities of turpentine and rosin and the better grades of rosin. This is due to the close proximity of the freshly cut resin ducts to the box or cup, there being less chance for the gum to drip over the edge of the box or to accumulate extraneous matter or evaporate in flowing to the box. With every new cut made on the face of the tree the point of exudation becomes farther removed from the box, and as the distance which the gum must traverse to reach the box or cup becomes greater, increasing loss is sustained by evaporation, and impurities and coloring matter are absorbed to a greater extent. Thus there is each year a deterioration in the quality of the resin produced. The losses sustained by evaporation and discoloration have been minimized, although not eliminated, by the cup system, it being possible to move the cup up each year above the old face and set it immediately below the new season's chipping. Scrape, like dip, varies in value, although not to so great a degree, with the age of the crop. The yield in quantity, however, is greater in the succeeding years than in the first year.

Scrape contains approximately one-half as much spirits of turpentine and about twice as much rosin as does dip; it constitutes the basis of about one-fourth of the total products of the industry. Other conditions besides the age of the crop affect the quantity and the producing quality of the crude gum. Extremely hot weather during the chipping season, for instance, increases the loss by evaporation, especially on old faces. Loss by evaporation is also sustained when either dip or scrape is withheld from the still longer than necessary.

Extent of turpentine operations.—The unit of measure in turpentine operations is the "crop," which consists of 10,500 boxes or cups. Table 18 shows, by states, the total number and the age of the crops worked, the system used in working them, and the number worked in back-boxed timber. This table presents data for 1909 only, as comparative figures are not obtainable.

Of the 20,158 crops worked in 1909, 6,795, or 33.7 per cent, were in back-boxed timber. The largest percentage of back-boxed crops is shown for Georgia and the smallest percentage for Louisiana, while in Texas all of the crops were in round timber.

	United States.	Ala- bama.	Florida.	Georgia.	Louis- iana.	Missis- sippi.	North Carolina.	South Carolina.	Texas.
Number of establishments.....	1,585	175	593	592	23	64	79	58	3
Number of crops worked, total.....	20,158	1,945	9,923	6,178	633	1,053	62	271	93
By box system.....	17,775	1,636	8,809	5,721	365	871	60	271	52
By cup system.....	2,383	309	1,114	457	278	182	2	.....	41
Virgin (1st year), total.....	3,860	468	1,700	1,146	206	271	6	42	21
By box system.....	3,058	337	1,374	1,026	90	181	6	42	2
By cup system.....	802	131	326	120	116	90	.....	.....	19
Yearling (2d year), total.....	4,327	504	1,906	1,283	212	301	16	41	64
By box system.....	3,666	420	1,593	1,182	113	252	15	41	50
By cup system.....	661	84	313	101	99	49	1	.....	14
Third year, total.....	4,977	494	2,275	1,621	160	328	4	91	4
By box system.....	4,449	423	2,065	1,482	97	288	3	91	.....
By cup system.....	528	71	210	139	63	40	1	.....	4
Fourth year and older, total.....	6,994	479	4,042	2,128	55	153	36	97	4
By box system.....	6,602	456	3,777	2,031	55	150	36	97	.....
By cup system.....	392	23	265	97	.....	3	.....	.....	4
In round timber, total.....	13,363	1,667	8,435	1,461	617	995	19	76	93
By box system.....	11,791	1,407	7,708	1,361	339	831	17	76	52
By cup system.....	1,572	260	727	100	278	164	2	.....	41
In back-boxed timber, total.....	6,795	278	1,488	4,717	16	58	43	195	.....
By box system.....	5,984	229	1,101	4,360	16	40	43	195	.....
By cup system.....	811	49	387	357	.....	18	.....	.....	.....

Comparison of box and cup systems.—The cup system came into use in 1904 after its practicability had been demonstrated by the Forest Service of the United States Department of Agriculture. Its chief advantages over the box system are that it causes less damage to the vitality and stability of the tree and secures a greater yield and a better quality of crude gum. Owing, however, to its comparatively recent introduction, the cost of its installation, and the fact that the manufacturers of cups lack facilities to supply the rapidly developing demand, the use of the cup has not as yet become general. The cups for a "crop" cost approximately \$500 delivered at the plant, and the operation of the system costs a little more than that of the box system. Operators upon leased land, however, have been able to obtain decided concessions from the owners, conditional upon their using cups, and much timber has been utilized for turpentine operations which would have been withheld if it had been necessary to work it by boxes. The indications are that, in time, the use of the cup system will be almost universal. Table 19 shows, for each state, the number and percentage of crops worked by the box and the cup systems, respectively, in 1909.

Of the total number of crops reported, 11.8 per cent were worked by the cup system. The percentage of crops worked by this system was largest in Texas and Louisiana. New territory is being developed in these states, and it is natural to find a tendency to use improved methods. Only two crops worked by the cup system were reported for North Carolina and none for South Carolina.

Timber land controlled by turpentine operators.—The forests of the South have been rapidly depleted during the past 50 years through turpentine operations and saw milling. Pine forests were so abundant in the early days that no care was taken for their preservation, and trees were worked for turpentine in such a careless manner as to sap their vitality and leave them a prey to disease, fire, and storm. The Carolinas have been stripped almost bare of pine, the forests of Georgia have been greatly depleted, and deep inroads have been made in those of Florida, Alabama, and Mississippi. In Louisiana and Texas, however, the forests have not suffered the unwarranted damage wrought in the other states.

The value of timber land has greatly increased during the past 15 or 20 years. Land that formerly brought from 50 cents to \$3 per acre now sells at from \$5 to \$50 per acre, the average price for the entire turpentine section being from \$10 to \$15 per acre. Leases covering a period of from 3 to 5 years that could formerly be obtained at from \$75 to \$300 per crop now bring from \$500 to \$1,500, the average rate per crop being from \$750 to \$1,000.

Table 20 shows the acreage of land reported as held by active turpentine operators on December 31, 1909. As the census inquiry was confined to the collection of statistics from manufacturers, no data were obtained from companies or individuals who controlled timber

STATE.	CROPS WORKED: 1909				
	Total.	By box system.		By cup system.	
		Number.	Per cent.	Number.	Per cent.
United States.....	20,158	17,775	88.2	2,383	11.8
Alabama.....	1,945	1,636	84.1	309	15.9
Florida.....	9,923	8,809	88.8	1,114	11.2
Georgia.....	6,178	5,721	92.6	457	7.4
Louisiana.....	633	355	56.1	278	43.9
Mississippi.....	1,053	871	82.7	182	17.3
North Carolina.....	62	60	96.8	2	3.2
South Carolina.....	271	271	100.0	.....	.....
Texas.....	93	52	55.9	41	44.1

land but who were not engaged in the manufacture of turpentine and rosin in 1909.

The table shows that turpentine operators controlled 8,056,915 acres of timber land. More than one-half of this acreage was in Florida, while North Carolina reported a smaller amount than any other state. It was estimated by the establishments reporting that this land would afford in the future 13,632 virgin crops—7,070 in round timber and 6,562 in back-boxed timber. In order to arrive at an estimate of the total number of crops in workable timber controlled by turpentine operators on January 1, 1910, it is necessary to add to the number of virgin crops as given

above the crops already in course of operation on that date. As shown in Table 18, 20,158 crops were worked in 1909, of which 6,994 were fourth-year or older boxes. Assuming that these old crops would not be worked again, there would remain 13,164 crops which would be available for working in 1910. Thus the total number of crops under the control of turpentine operators on January 1, 1910, may be placed at 26,796, though of course not all of the virgin crops reported as available would be worked in 1910. The distribution of the total estimated number of crops is as follows: Virgin crops, 13,632; yearling, 3,860; third-year, 4,327; and fourth-year, 4,977.

Table 20

STATE.	Number of establishments.	TIMBER LAND HOLDINGS ON DEC. 31, 1909.									
		Total.		Owned.					Leased.		
		Acreage.	Number of virgin crops.	Acreage.	Number of virgin crops available (estimated).			Acreage.	Number of virgin crops available (estimated).		
					Total.	Round timber.	Timber that will be back-boxed.		Total.	Round timber.	Timber that will be back-boxed.
United States.....	1,585	8,056,916	13,632	3,249,577	5,755	3,270	2,485	4,807,338	7,877	3,800	4,077
Alabama.....	175	584,634	841	185,186	245	162	83	399,448	596	443	153
Florida.....	693	4,694,625	8,581	2,227,047	4,446	2,562	1,884	2,467,578	4,135	2,255	1,880
Georgia.....	592	2,148,719	2,948	556,097	555	175	380	1,592,622	2,393	445	1,948
Louisiana.....	23	189,326	572	108,215	224	222	2	81,111	348	347	1
Mississippi.....	64	268,837	415	93,450	112	100	12	175,387	303	256	47
North Carolina.....	79	31,800	52	15,800	27	5	22	16,000	25	11	14
South Carolina.....	56	102,712	191	63,782	146	44	102	38,930	45	11	34
Texas.....	3	36,262	32					36,262	32	32	

The naval-stores "factor."—The "factor" is the middle man between the producer of turpentine and rosin and the distributor, and at the same time the confidential adviser and banker of the producer. He carries no stock and does not sell to the consumer, his sales being made either to the distributor or to the dealer, who, in turn, sells to the consumer. As a rule, the factor advances the funds and supplies for carrying on the season's operations, and when the products are ready to be marketed they are shipped to him. At several important ports there are storage yards for turpentine and rosin where, by an arrangement between the factors and the owners of the yards, all shipments are received, inspected, graded, and stored subject to the factor's order. Sales are made as business exigencies warrant, but, as a rule, the products are quickly disposed of.

Inspection and grading.—While there are minor differences in the local laws, practically the same rules and standards govern the inspection and grading of turpentine and rosin in all of the states. The most extensive naval-stores yards are located in Savannah, Ga., and Jacksonville and Fernandina, Fla. When turpentine or rosin is received at these yards, it passes into the hands of inspectors, who are sworn and bonded officials either of the state or of the city, and who are required to comply with certain specified state, municipal, and trade regulations.

Every barrel of spirits of turpentine or rosin is carefully examined, the weight and grade of its contents are branded upon the barrel, and sworn certificates as to the contents are made and furnished to the factor. Laws as to misbranding and adulterating turpentine and rosin are stringent. Turpentine is graded according to color and termed "waterwhite," "standard," "off one shade," "off two shades," and "off three shades," the last-named grade not being merchantable. There is a reduction of a few cents per gallon in the price of the off shades, as compared with the other grades. It is the custom, however, to add a small quantity of colored to standard turpentine in barrels which are not full, the revenue to the producer for his colored turpentine being thus slightly increased. Rosin is graded according to its color, the lighter shades constituting the higher grades. The standard grades are as follows: WW (waterwhite), WG (window glass), N (extra pale), M (pale), K (low pale), I (extra No. 1), H (No. 1), G (No. 1), F (good No. 2), E (low No. 2), D (good strained), and A, B, C, (common strained). The yard expenses, such as storage, insurance, repairs to defective barrels, etc., are borne by the producer. As turpentine and rosin are sold to distributors and other buyers to be taken at the yard, the transaction does not necessitate the immediate handling of the shipment, the ownership simply passing from one party to another. Some of the naval-stores

yards are equipped with immense steel storage tanks in which turpentine may be stored for any length of time for a specified sum per gallon; the number of gallons stored is certified to and owners may withdraw a part or the whole at any time.

Method of establishing prices.—The method of establishing prices for turpentine and rosin is described in the following article prepared by Thomas Purse, superintendent of the Savannah Board of Trade, and printed in the Naval Stores Review (Savannah, Ga.) for May 17, 1911.

For the past 28 years the Savannah Board of Trade, successor to the old Naval Stores Exchange, has had the duty imposed upon it of setting the prices on naval stores for the world. Prices on spirits of turpentine and all grades of rosin (12 in number) are made twice each day by this association (11 a. m. and 4 p. m., respectively). While the average man realizes in a vague way the importance of Savannah as a naval-stores market, few outside of those directly interested in naval stores realize that the Savannah Board of Trade sets the prices for the world. Savannah is the largest "open" market in this country. The quotations at all other markets are based on Savannah. The same thing applies to the markets in foreign countries where naval stores are quoted. The location of Savannah is therefore peculiar, and its importance in the industry is inestimable. The manner in which these quotations are arrived at is of some interest, even to those not in the trade. The prices are determined by the committee on quotations, the members of which consist of two factors and two exporters. This committee is appointed by the board of directors each 60 days. It is necessary that a majority, or three out of the four members of the committee, vote together before a quotation can be posted. In the event of a tie one factor and one exporter are added to the committee, and this procedure continues until a decision on the quotation has been reached.

Each factor advises the superintendent of the board of trade daily of the number of casks of spirits of turpentine sold, and the prices, and the number of barrels of each grade of rosin sold, and prices obtained therefor. This information is then consolidated by the superintendent and posted on the boards of the exchange. The committee on quotations then make up their quotations for the day, basing same upon actual transactions reported.

Four tones are used to indicate the state of the market—"firm," when everything is sold or there is a demand sufficient to absorb the offerings; "steady," when only a portion of the receipts have been sold and some remain undisposed of in the factors' hands; and "quiet" or "dull" when there is little or no demand and all or the larger part of the receipts remain in first hands. When there are no

sales of turpentine or rosin for two days, the receipts remaining in the factors' hands awaiting a purchaser, it is customary to describe the market condition by the use of the words "nothing doing," with a statement as to the date of last sales and the prices then paid. This remains upon the quotation board until actual transactions are reported on which to base new quotations. Sales between buyers are not considered in making quotations, but only those between factors and buyers.

Open and closed ports.—Savannah, Ga., and Jacksonville, Fla., are known as open ports, the presence of buyers of turpentine and rosin at these ports creating competition and thus influencing prices. In Jacksonville receipts are disposed of by sealed bids received by the factors. The cities of Brunswick, Ga., Pensacola, Fla., Mobile, Ala., and Gulfport, Miss., are known as closed ports, as no competition exists at these ports. The daily receipts of the factors at these ports are bought under contract, the prices being based upon the average closing quotations of the Savannah market. That is, if more than one quotation prevails in Savannah, the producer receives a price midway between the highest and the lowest. For instance, if turpentine is being quoted at from 50 to 53 cents, the producer who ships turpentine to these ports receives on that particular day 51½ cents per gallon. While Fernandina is a closed port, there being only one buyer located there, its receipts are not taken by contract daily, as in the other closed ports mentioned, but by agreement. When a large buyer comes to the Jacksonville market and is successful in buying at his bid there, he takes the Fernandina receipts also on the same terms. In New Orleans, although some competition exists, most of the receipts are taken under daily contract. In Charleston and Wilmington the receipts are small and are disposed of according to private agreement between the buyers and the sellers.

Table 21 shows the range of prices of spirits of turpentine and of the five most important grades of rosin during the 11 years 1899-1909. These statistics were compiled from the records of the Savannah Board of Trade.

YEAR. ¹	Spirits of turpentine—price per gallon (cents).		ROSIN—PRICE OF SPECIFIED GRADE PER BARREL OF 280 POUNDS.									
	High.	Low.	WW		WG		K		F		D	
			High.	Low.	High.	Low.	High.	Low.	High.	Low.	High.	Low.
1909-1910.....	60½	35½	\$7.30	\$5.00	\$7.05	\$4.90	\$5.95	\$4.75	\$4.82	\$3.40	\$4.42	\$2.85
1908-1909.....	50½	35	6.55	5.70	6.50	5.60	5.75	4.20	3.70	2.60	3.50	2.32
1907-1908.....	69	40	6.85	5.40	6.50	5.30	5.80	4.45	4.90	2.77	4.57	2.67
1906-1907.....	74½	56½	7.25	4.50	6.75	4.40	5.60	4.10	4.60	3.70	4.35	3.60
1905-1906.....	79	53	6.20	4.00	6.10	3.85	5.20	3.60	4.75	2.75	4.10	2.60
1904-1905.....	57	46½	5.15	3.75	5.00	3.50	4.05	3.10	3.00	2.55	2.90	2.60
1903-1904.....	65	45	4.75	4.30	4.40	3.10	4.15	2.80	2.90	1.65	2.80	1.55
1902-1903.....	65	42	4.25	3.50	3.85	3.25	3.20	2.40	2.10	1.20	2.05	1.10
1901-1902.....	53	31	3.95	2.25	3.70	2.00	2.45	1.65	1.50	1.10	1.40	1.00
1900-1901.....	53½	34	3.35	2.25	3.05	2.00	2.25	1.60	1.60	1.20	1.50	1.05
1899-1900.....	54½	35	3.65	2.20	3.50	2.00	2.25	1.30	1.60	1.00	1.50	0.90

¹ The naval-stores year, from April 1 to March 31.

Exports.—Table 22 shows the quantity of turpentine and rosin exported in the fiscal years ending June 30, 1910 and 1905, respectively, in comparison with the production in the calendar years 1909 and 1904.

It will be noted that the exports of turpentine in each of the years for which statistics are given represent over 50 per cent of the production reported for the census year most nearly corresponding, and the

exports of rosin over 65 per cent. Both production and exports show a decrease for the five-year period.

PRODUCT.	PRODUCTION.		EXPORTS.		Per cent exports formed of total production.
	Year.	Quantity.	Year.	Quantity.	
Spirits of turpentine (gallons)....	1909 1904	28,988,954 30,687,051	1910 1905	15,587,737 15,894,813	53.8 51.8
Rosin (barrels of 280 pounds)....	1909 1904	3,263,857 3,508,347	1910 1905	2,144,318 2,310,275	65.7 65.8

Table 23 shows the amount of turpentine and rosin exported to each of the six grand divisions of the world during 1910 and the percentage that the exports to each formed of the total.

GRAND DIVISION.	TURPENTINE AND ROSIN EXPORTED: YEAR ENDING JUNE 30, 1910.			
	Turpentine.		Rosin.	
	Quantity (gallons).	Per cent of total.	Quantity (barrels of 280 pounds).	Per cent of total.
Total.....	15,587,737	100.0	2,144,318	100.0
Europe.....	12,958,892	83.1	1,659,415	77.4
North America.....	1,162,198	7.5	103,249	4.8
South America.....	895,747	5.7	314,174	14.7
Asia.....	58,482	0.4	37,081	1.7
Oceania.....	403,154	2.6	25,400	1.2
Africa.....	109,264	0.7	4,999	0.2

Of the total exports, 83.1 per cent of the turpentine and 77.4 per cent of the rosin went to Europe. Of the European countries the United Kingdom took the largest quantity of turpentine and Germany the largest quantity of rosin. Canada received the greater part of

the exports to North American ports. Of the South American countries Argentina took the largest quantity of turpentine and Brazil the largest quantity of rosin.

The exports of turpentine and rosin during the year ending June 30, 1910, are shown by customs districts in Table 24.

CUSTOMS DISTRICT.	TURPENTINE AND ROSIN EXPORTED: YEAR ENDING JUNE 30, 1910.			
	Turpentine.		Rosin.	
	Quantity (gallons).	Per cent of total.	Quantity (barrels of 280 pounds).	Per cent of total.
Total.....	15,587,737	100.0	2,144,318	100.0
Savannah, Ga.....	5,191,003	33.3	638,131	29.8
Fernandina, Fla.....	4,195,123	26.9	414,360	19.3
New York, N. Y.....	1,664,601	10.7	317,919	14.8
Pensacola, Fla.....	1,641,029	10.5	208,990	9.7
Tampa, Fla.....	744,055	4.8	91,163	4.3
New Orleans, La.....	571,285	3.7	67,828	3.2
Brunswick, Ga.....	484,500	3.1	98,244	4.6
All other.....	1,096,141	7.0	307,683	14.3

Savannah, Ga., was the shipping port for 33.3 per cent of the turpentine and 29.8 per cent of the rosin exported during the fiscal year ending June 30, 1910. Fernandina, Fla., ranked second in exports of these products, with 26.9 per cent of the turpentine and 19.3 per cent of the rosin. Although New York is far removed from the producing section, 10.7 per cent of the turpentine and 14.8 per cent of the rosin exported were shipped from that port. The greater part of the turpentine and rosin from Jacksonville, Fla., which is exported goes by way of Fernandina, from which port are shipped also large quantities of Georgia products.

Table 25 shows the quantity and value of the exports of turpentine and rosin from 1850 to 1910.

YEAR ENDING JUNE 30—	TURPENTINE AND ROSIN EXPORTED.				YEAR ENDING JUNE 30—	TURPENTINE AND ROSIN EXPORTED.					
	Total value.	Spirits of turpentine.		Rosin.		Total value.	Spirits of turpentine.		Rosin.		
		Quantity (gallons).	Value.	Quantity (barrels of 280 pounds).			Value.	Quantity (gallons).	Value.	Quantity (barrels of 280 pounds).	Value.
1850.....	\$1,372,454	644,616	\$229,741	398,111	\$1,142,713	\$4,500,334	7,091,200	\$2,132,154	1,040,345	\$2,368,180	
1851.....	1,209,252	363,828	145,410	387,220	1,063,842	4,044,142	6,595,528	2,414,719	1,023,710	2,529,423	
1852.....	1,347,029	358,658	137,856	449,194	1,209,173	7,038,837	8,136,493	3,798,034	1,156,012	3,240,803	
1853.....	1,753,980	634,371	347,492	454,715	1,406,488	7,434,361	9,867,344	4,366,229	1,347,256	3,068,132	
1854.....	1,322,026	1,663,523	1,055,720	601,280	2,066,306	2,613,416	11,300,729	3,885,500	2,159,470	2,327,916	
1855.....	2,898,580	2,339,138	1,137,152	731,060	1,761,428	2,418,345	8,987,226	2,690,231	2,285,482	2,228,114	
1856.....	2,061,114	1,844,560	839,048	524,799	1,222,066	2,807,867	8,217,678	2,811,777	2,144,857	1,996,090	
1857.....	2,285,918	1,522,177	741,346	641,517	1,544,572	5,820,801	10,209,883	3,489,895	2,379,257	2,330,906	
1858.....	2,653,492	2,457,235	1,089,282	874,573	1,464,210	5,890,124	10,585,942	3,580,106	2,153,017	2,310,018	
1859.....	3,554,416	2,682,230	1,306,035	798,083	2,248,381	5,923,913	9,681,759	3,777,525	2,434,573	2,146,388	
1860.....	3,734,627	4,072,023	1,916,289	770,652	1,813,238	7,368,341	11,248,920	4,590,931	2,619,704	2,797,410	
1861.....	2,253,044	2,941,855	1,192,787	536,207	1,060,257	8,152,619	12,243,621	4,668,140	2,179,792	3,484,379	
1862.....	348,091	43,507	64,691	65,441	293,400	2,807,516	13,176,470	4,800,721	2,195,953	2,436,785	
1863.....	381,768	58,565	143,777	17,025	237,991	7,247,057	13,415,459	3,893,436	2,068,333	2,353,621	
1864.....	143,539	32,548	87,988	2,418	55,551	6,753,212	12,618,407	3,437,245	2,000,753	2,316,967	
1865.....	265,105	51,863	106,967	11,278	158,138	7,378,100	14,652,738	3,998,277	2,874,759	2,379,823	
1866.....	1,817,144	349,325	313,086	250,452	1,504,058	8,809,518	17,431,566	4,613,811	2,191,254	2,485,707	
1867.....	2,965,564	1,513,225	980,699	334,104	1,984,865	9,180,080	17,302,823	4,447,551	2,448,036	2,432,629	
1868.....	3,656,091	3,068,629	1,627,577	443,501	2,028,514	9,118,669	18,361,140	5,380,806	2,226,428	2,737,863	
1869.....	3,465,487	3,184,955	1,444,968	685,989	2,020,519	9,896,953	17,761,533	6,100,419	2,686,174	2,585,534	
1870.....	3,133,927	3,246,697	1,357,302	583,316	1,776,625	12,397,112	18,090,582	8,554,922	2,389,364	2,842,190	
1871.....	2,610,189	2,453,654	1,009,608	611,959	1,600,651	10,976,486	20,240,851	7,715,029	2,820,815	4,425,457	
1872.....	6,778,211	4,495,441	2,521,357	892,728	3,256,854	11,633,352	19,177,788	7,431,248	2,535,962	4,202,104	
1873.....	6,299,382	5,114,653	2,667,386	845,162	3,831,996	12,831,527	16,378,787	8,014,322	2,396,498	4,817,205	
1874.....	6,305,364	6,784,173	2,768,933	929,342	3,046,431	16,068,025	17,202,808	9,446,135	2,585,108	6,621,870	
1875.....	4,698,963	6,599,624	1,924,644	937,267	2,774,419	15,971,185	15,894,813	8,902,101	2,310,275	7,069,084	
1876.....	3,860,691	5,178,934	1,672,068	924,526	2,188,623	19,976,348	15,981,253	10,077,268	2,438,556	9,899,080	
1877.....	4,659,017	6,796,927	2,274,639	900,056	2,384,378	19,568,974	15,854,676	10,241,883	2,580,966	11,327,091	
1878.....	5,662,888	7,633,568	3,333,569	1,042,183	2,329,819	21,541,277	19,332,583	10,146,161	2,712,732	11,395,126	
1879.....	4,204,814	7,576,556	2,045,673	1,112,816	2,159,141	15,022,896	17,502,028	7,018,568	2,170,177	8,004,838	
1880.....						18,533,724	16,587,737	8,780,236	2,144,318	9,753,488	

¹ The value of tar and pitch is included with that of rosin for the years 1850 to 1854, inclusive.
² The quantity and value of pitch for the years 1884 to 1900, inclusive, are included with those of rosin.

MANUFACTURES.

TURPENTINE AND ROSIN—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.				Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—		Male.		Female.	Male.	Female.		
								Maximum month.	Minimum month.							
United States....	1,585	44,524	2,567	1,146	1,296	4	39,511	Jy 40,634	Ja 37,112	41,272	40,593	60	612	7	4,129	
Alabama.....	175	3,965	255	128	62	1	3,519	Je 3,860	Ja 2,831	3,693	3,655	.....	38	.....	384
Florida.....	593	20,037	1,051	531	960	2	18,143	Jy 18,456	Fe 17,556	18,750	18,412	22	309	7	1,916	
Georgia.....	592	14,253	1,003	337	126	.....	12,787	My 13,016	Ja 12,288	13,120	12,923	.....	197	.....	1,407
Louisiana.....	23	1,800	19	45	47	1	1,688	Au ¹ 1,821	Ja 1,407	1,837	1,830	.....	7	.....	105
Mississippi.....	64	2,811	71	79	88	.....	2,573	My 2,663	Fe 2,413	2,862	2,794	18	50	.....	236
North Carolina.....	79	249	103	5	2	.....	139	Je 162	Ja 102	168	167	.....	1	.....	19
South Carolina.....	56	524	63	15	3	.....	443	Se 544	Ja 232	586	556	20	10	.....	2
Texas.....	3	235	2	6	8	.....	219	De 256	Ja ¹ 190	256	256	.....	.....	.....	10

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.			Miscellaneous.				
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States....	\$12,400,978	\$19,032,630	\$921,802	\$733,589	\$9,363,359	\$12,339	\$4,898,499	\$2,105	\$191,612	\$658,006	\$2,251,419	\$25,295,017	\$20,384,179
Alabama.....	1,396,587	1,818,862	90,793	34,597	905,855	568	485,224	.....	14,536	78,126	209,163	2,471,999	1,986,207
Florida.....	5,510,987	9,116,757	450,638	536,260	4,316,348	3,472	1,965,596	1,950	129,342	578,696	1,134,455	11,937,518	9,968,450
Georgia.....	2,989,971	5,134,671	229,033	63,603	2,930,808	700	1,258,943	.....	34,976	.....	616,608	6,938,957	5,679,314
Louisiana.....	804,345	749,810	54,999	33,091	420,005	1,607	157,042	.....	3,146	1,184	78,736	1,173,848	1,015,199
Mississippi.....	1,250,971	1,225,748	76,719	55,333	581,532	915	348,194	130	6,018	.....	156,907	1,474,629	1,125,520
North Carolina.....	158,716	534,127	2,350	1,380	28,242	4,018	478,918	25	767	.....	18,427	673,954	191,018
South Carolina.....	128,727	303,087	7,750	1,165	100,701	1,009	162,777	.....	2,202	.....	27,483	406,286	242,500
Texas.....	160,674	149,568	9,520	3,160	79,868	50	41,805	.....	525	.....	9,640	217,826	175,971

¹ Same number reported for one or more other months.

BOOTS AND SHOES, INCLUDING CUT
STOCK AND FINDINGS

(895)

BOOT AND SHOE INDUSTRY.

GENERAL STATISTICS.

Summary for the three branches of the industry: 1909.—Table 1 presents a summary of the more important statistics of the boot and shoe industry as a whole for 1909, and also for its three branches. The three classes of establishments distinguished are (1) establishments whose chief products are finished boots and shoes (including a few performing only special processes); (2) establishments whose chief products are boot and shoe cut stock, such as soles, heels, tips, inner soles, top lifts, etc.; and (3) establishments whose chief products are boot and shoe findings, such as shoe pegs, bows, clasps, stays, rands, counters, shoe trimmings, etc. Many of the establishments in class

1 which manufacture boots and shoes also make cut stock and findings, mostly for their own use, and the data for classes 2 and 3, therefore, do not bring out the full importance of these branches of the business. The establishments in classes 2 and 3, on the other hand, do not manufacture any complete boots or shoes. The value of the products of these two classes is largely duplicated in that for class 1, and therefore in the total value for the combined industry. Except where otherwise expressly stated, the tables in this report present statistics for the industry as a whole.

The industry does not include the manufacture of rubber boots and shoes.

Table 1	Total for the industry.	ESTABLISHMENTS MANUFACTURING PRINCIPALLY—		
		Boots and shoes.	Boot and shoe cut stock.	Boot and shoe findings.
Number of establishments.....	1,918	1,343	232	343
Persons engaged in the industry.....	215,923	200,847	7,535	7,541
Proprietors and firm members.....	1,238	1,218	255	365
Salaried employees.....	15,788	14,513	587	688
Wage earners (average number).....	198,297	185,116	6,693	6,488
Primary horsepower.....	96,302	85,896	4,769	5,637
Capital.....	\$222,324,248	\$197,090,344	\$15,735,034	\$9,498,870
Expenses.....	477,843,146	412,813,602	41,823,014	23,206,530
Services.....	117,092,116	109,646,165	3,799,752	3,646,199
Salaries.....	18,629,421	17,287,013	643,292	699,116
Wages.....	98,462,695	92,359,152	3,156,460	2,947,083
Materials.....	332,738,213	277,467,743	36,919,919	18,350,551
Miscellaneous.....	28,012,817	25,699,694	1,103,343	1,209,780
Value of products.....	1,512,797,642	442,630,726	44,661,497	25,505,419
Value added by manufacture (value of products less cost of materials).....	180,059,429	165,162,983	7,741,578	7,154,868

¹ In addition, products to the value of \$1,439,280 which pertained to the boot and shoe industry were produced by establishments primarily engaged in the manufacture of leather belting and hose; sporting and athletic goods; leather, tanned, curried, and finished; saddlery and harness; and other products.

Of the 1,918 establishments reporting in 1909, 1,343, or 70 per cent, were engaged in the manufacture of boots and shoes, these establishments making products to the value of \$442,630,726, or 86.3 per cent of the total value of products for the industry as a whole (\$512,797,642). Establishments engaged chiefly in the manufacture of cut stock formed about one-eighth of the total number, and the value of their products, \$44,661,497, represented 8.7 per cent of the total for the entire industry. Establishments engaged chiefly in the manufacture of boot and shoe findings formed somewhat more than one-sixth of the total number, and the value of their products, \$25,505,419, represented 5 per cent of the total.

The products reported for the industry include products other than boots and shoes to the value of \$1,276,414. These consist principally of leather; leather goods; blacking and cleansing and polishing preparations; and paste.

The cost of the materials used in the industry as a whole in 1909 was \$332,738,213, which is equal to 64.9 per cent of the total value of products, while the value

added by manufacture (that is, the value of products less the cost of materials) was \$180,059,429. The establishments in the industry as a whole gave employment on the average to 215,923 persons, of whom 198,297 were wage earners, and paid out \$117,092,116 in salaries and wages.

Comparison with earlier censuses for the industry as a whole.—Table 2 summarizes the statistics for the combined industry for each census from 1879 to 1909, inclusive.

Although the manufacture of boots and shoes was one of the earliest manufacturing industries in the country, statistics which are comparable with those for the census of 1909 can not be shown for censuses earlier than 1879, because prior to that census data for the factories were not distinguished from those for the numerous small shops engaged chiefly in custom and repair work. At the censuses of 1904 and 1909 such small shops were not canvassed; from 1879 to 1899 they were canvassed, but the data were tabulated separately and have been excluded from Table 2.

	BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS.									
	Number or amount.					Per cent of increase. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	1,918	1,895	2,253	2,881	2,347	-14.9	1.2	-15.9	-21.8	22.8
Persons engaged in the industry...	215,923	171,940	(²)	(²)	(²)	25.6	25.6			
Proprietors and firm members.....	1,838	2,128	(²)	(²)	(²)	-13.6	-13.6			
Salaries employees.....	15,788	9,518	8,348	(²)	(²)	89.1	65.9	14.0		
Wage earners (average number).....	198,297	160,294	151,231	142,116	115,972	31.1	23.7	6.0	(²)	(²)
Primary horsepower.....	96,302	63,968	55,489	35,461	11,874	73.6	50.5	15.3	56.5	206.4
Capital.....	\$222,324,248	\$136,801,701	\$110,363,152	\$103,693,294	\$45,184,392	101.4	62.5	24.0	6.4	123.5
Expenses.....	\$477,843,146	\$328,474,578	\$272,958,371	\$216,685,768	(²)	75.1	45.5	20.3	26.0	
Services.....	\$117,092,116	\$82,483,671	\$70,082,729	\$70,368,620	(²)	67.1	42.0	17.7	-0.4	
Salaries.....	\$18,629,421	\$9,411,905	\$8,158,664	(²)	(²)	128.3	97.9	15.4		
Wages.....	\$98,462,695	\$73,071,766	\$61,924,065	(²)	\$44,358,420	59.0	34.7	18.0		
Materials.....	\$332,738,213	\$225,288,177	\$191,455,527	\$136,398,585	\$110,018,612	73.8	47.7	17.7	40.4	24.0
Miscellaneous.....	\$28,012,817	\$20,702,730	\$11,420,115	\$9,918,563	(²)	145.3	35.3	81.3	15.1	
Value of products.....	\$512,797,642	\$357,688,160	\$290,047,087	\$245,358,534	\$176,517,776	76.8	43.4	23.3	18.2	39.0
Value added by manufacture (value of products less cost of materials).....	\$180,069,429	\$132,399,983	\$98,591,560	\$108,959,949	\$66,499,164	82.6	36.0	34.3	-9.5	63.9
Number of pairs of boots and shoes, all kinds.....	285,017,181	242,110,035	217,965,419	179,409,388	125,478,611	30.8	17.7	11.1	21.5	43.0

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Percentage omitted because figures are not strictly comparable.

² Comparable figures not available.

The value of products of the industry in 1909 was nearly three times as great as in 1879. This increase is due in part to the advance which has taken place in the prices of materials, but is due also to increased quantity of output. The number of pairs of boots and shoes made more than doubled during the 30 years.

Very few industries have been more affected by the introduction of machinery than the manufacture of boots and shoes, and to this fact may be attributed the relatively small increase shown in the average number of wage earners during the 30-year period covered by the table. In 1909 the amount paid in wages formed 19.2 per cent of the value of products, as compared with 25.1 per cent in 1879. There was a decrease of 0.4 per cent in services between 1889 and 1899, and an increase of 6.4 per cent in the average number of wage earners. The application of machinery, in addition to reducing the number of wage earners required for a given product, no doubt caused

the displacement of many highly skilled wage earners by less skilled employees to whom lower wages were paid. The rapid increase in horsepower of engines shown in Table 2 contrasts conspicuously with the data for wage earners.

Between 1899 and 1909 the number of wage earners in the industry as a whole increased 31.1 per cent, the amount paid in wages 59 per cent, the cost of materials 73.8 per cent, the value of products 76.8 per cent, and the number of pairs of boots and shoes made 30.8 per cent. The difference between the last two percentages is doubtless due in part to advance in prices, but it may be attributable in part to a relatively greater increase in the production of high-grade products than in that of products of lower grades.

Comparison with earlier censuses for the three branches of the industry.—Table 3 presents somewhat more briefly statistics for each of the three branches of the industry from 1879 to 1909.

	1909	1904	1899	1889	1879
ESTABLISHMENTS MANUFACTURING PRINCIPALLY BOOTS AND SHOES.					
Number of establishments.....	1,343	1,316	1,599	2,082	1,959
Wage earners (average number).....	185,116	149,924	141,830	133,690	111,152
Wages.....	\$92,359,152	\$69,059,680	\$58,440,883	\$60,667,145	\$43,001,438
Cost of materials.....	\$277,467,743	\$197,363,495	\$168,632,654	\$118,785,831	\$102,442,442
Value of products.....	\$442,630,726	\$320,107,458	\$258,969,580	\$220,649,358	\$166,050,354
Value added by manufacture.....	\$165,162,983	\$122,743,963	\$90,336,926	\$101,863,527	\$63,607,912
ESTABLISHMENTS MANUFACTURING PRINCIPALLY BOOT AND SHOE CUT STOCK.					
Number of establishments.....	232	290	342	344	172
Wage earners (average number).....	6,693	6,936	6,155	4,992	2,885
Wages.....	\$3,156,460	\$2,364,209	\$2,230,691	\$1,891,031	\$735,482
Cost of materials.....	\$36,919,919	\$21,586,872	\$17,800,282	\$13,744,655	\$5,939,249
Value of products.....	\$44,661,497	\$27,075,815	\$23,242,892	\$17,903,846	\$7,531,635
Value added by manufacture.....	\$7,741,578	\$6,088,943	\$5,442,610	\$4,159,191	\$1,592,386
ESTABLISHMENTS MANUFACTURING PRINCIPALLY BOOT AND SHOE FINDINGS.					
Number of establishments.....	343	289	312	455	216
Wage earners (average number).....	6,488	4,434	3,246	3,434	1,935
Wages.....	\$2,947,083	\$1,647,877	\$1,252,491	\$1,205,397	\$621,500
Cost of materials.....	\$18,350,551	\$6,337,810	\$5,022,591	\$3,868,099	\$1,636,921
Value of products.....	\$25,605,419	\$9,904,887	\$7,834,615	\$6,905,330	\$2,935,787
Value added by manufacture.....	\$7,154,968	\$3,567,077	\$2,812,024	\$2,937,231	\$1,298,866

In 1909 the value of products for establishments making principally cut stock and for those making findings formed 8.7 per cent and 5 per cent, respec-

tively, of the total for the industry as a whole, as compared with 4.3 per cent and 1.7 per cent, respectively, in 1879.

Table 4 gives the important data for each of the three branches of the industry for 1899 and 1909, with the absolute and percentages of increase.

In the manufacture of complete boots and shoes, the largest of the three branches of the industry, there was a decided increase between 1899 and 1909 in all items except in the number of establishments, for which a decrease is shown. The value of products increased 70.9 per cent during the decade. The es-

tablishments engaged chiefly in the manufacture of cut stock decreased in number; but for the other items—except number of wage earners, which increased only 8.7 per cent—there were large percentages of gain, that for value of products being 92.1 per cent. Much the highest percentages of increase are shown for establishments engaged primarily in the manufacture of boot and shoe findings, the value of products for this branch showing a gain of 225.5 per cent.

Table 4

	ESTABLISHMENTS MANUFACTURING PRINCIPALLY—											
	Boots and shoes.				Boot and shoe cut stock.				Boot and shoe findings.			
	1909	1899	Increase. ¹		1909	1899	Increase. ¹		1909	1899	Increase.	
			Amount.	Per cent.			Amount.	Per cent.			Amount.	Per cent.
Number of establishments.....	1,343	1,599	-256	-16.0	232	342	-110	-32.2	343	312	31	9.9
Persons engaged in the industry.....	200,847	(?)	.....	.....	7,535	(?)	.....	.....	7,541	(?)	.....	.....
Proprietors and firm members.....	1,218	(?)	.....	.....	255	(?)	.....	.....	365	(?)	.....	.....
Salaried employees.....	14,513	7,779	6,734	86.6	587	342	245	71.6	688	227	461	203.1
Wage earners (average number).....	185,116	141,830	43,286	30.5	6,693	6,155	538	8.7	6,488	3,246	3,242	99.9
Primary horsepower.....	85,896	49,444	36,452	73.7	4,769	3,202	1,567	48.9	5,637	2,843	2,794	98.3
Capital.....	\$197,090,344	\$99,819,233	\$97,271,111	97.4	\$15,735,034	\$7,003,080	\$8,731,954	124.7	\$9,498,870	\$3,540,839	\$5,958,031	168.3
Expenses.....	412,813,602	245,412,888	167,400,714	68.2	41,823,014	20,824,410	20,998,604	100.8	23,206,530	6,721,073	16,485,457	245.3
Services.....	109,646,165	66,110,832	43,535,333	65.9	3,799,752	2,538,580	1,266,172	50.0	3,646,199	1,438,317	2,207,882	153.5
Salaries.....	17,287,013	7,669,949	9,617,064	125.4	643,292	302,889	340,403	112.4	699,116	185,826	513,290	276.2
Wages.....	92,359,152	58,440,883	33,918,269	58.0	3,156,460	2,230,691	925,769	41.5	2,947,083	1,252,491	1,694,592	135.3
Materials.....	277,467,743	168,632,654	108,835,089	64.5	36,919,919	17,800,282	19,119,637	107.4	18,350,551	5,022,591	13,327,960	265.3
Miscellaneous.....	25,689,694	10,669,402	15,030,292	140.9	1,103,343	490,548	612,795	124.9	1,209,780	260,165	949,615	365.0
Value of products.....	442,630,726	258,969,580	183,661,146	70.9	44,661,497	23,242,892	21,418,605	92.2	25,505,419	7,834,615	17,670,804	225.5
Value added by manufacture (value of products less cost of materials).....	165,162,983	90,336,926	74,826,057	82.8	7,741,578	5,442,610	2,298,968	42.2	7,154,868	2,812,024	4,342,844	154.4

¹ A minus sign (-) denotes decrease.

² Comparable figures not available.

Custom and factory work.—At the censuses of 1899, 1889, and 1879 separate statistics were presented for the factory manufacture of boots and shoes and for the shops doing chiefly custom and repair work. Table 5 shows the relative importance of these two branches of the industry in 1899 and 1879. Statistics for establishments engaged chiefly in the manufacture of cut stock and of findings are not included in this table.

CLASS OF ESTABLISHMENTS.	BOOT AND SHOE INDUSTRY PROPER.					
	Number of establishments.		Average number of wage earners.		Value of products.	
	1899	1879	1899	1879	1899	1879
Total.....	25,160	17,372	152,620	133,919	\$237,579,258	\$198,920,481
Factories.....	1,599	1,359	141,830	111,152	258,969,580	166,050,354
Custom and repair shops.....	23,561	16,013	10,790	22,767	28,609,678	30,870,127
Per cent of total...	100.0	100.0	100.0	100.0	100.0	100.0
Factories.....	6.4	10.9	92.9	83.0	90.1	84.3
Custom and repair shops.....	93.6	89.1	7.1	17.0	9.9	15.7

This table shows an increase during the 20-year period in the number of custom shops and a decrease in the average number of wage earners and value of products. The large decrease shown in the average number of wage earners may be due to the fact that proprietors and firm members were first separately called for in 1899, and that many of them were probably reported as wage earners in 1879, since in a large number of the shops of this character

the proprietors perform the entire work. In 1899 the custom shops represented considerably more than nine-tenths of the total number of establishments for both classes combined, but contributed less than one-tenth of the value of products.

Specialization in the boot and shoe industry.—Aside from the specialization in the industry designated "boots and shoes, including cut stock and findings," which is indicated by the distinction of the three main branches shown in previous tables, there is in certain cases still further specialization within that branch of the industry designated as the manufacture of boots and shoes proper. Most of the establishments assigned to this branch of the industry make complete boots and shoes from stock either cut by themselves or purchased, but there are a number of factories assigned to the group which perform only special operations, usually on materials furnished by others. Thus some do only stitching, some make buttonholes, and others do crimping, while still others perform other processes. The amount paid for these several processes becomes a part of the total value of products of the boot and shoe industry proper, and to this extent there is a duplication of values. These highly specialized establishments in the boot and shoe industry, however, are of comparatively small importance, as will be seen from Table 6, in which each establishment has been classified according to its product or business of chief value.

Table 6

CLASS OF ESTABLISHMENTS.	BOOT AND SHOE INDUSTRY PROPER: 1909					
	Estab-lish-ments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
Total	1,343	185,116	\$92,359,152	\$277,467,743	\$442,630,728	\$185,182,983
Factories making complete boots and shoes.....	1,228	182,642	91,284,239	275,298,510	438,443,370	163,144,860
Factories doing work not elsewhere specified on materials furnished.....	23	382	231,211	391,519	778,922	387,403
Factories doing stitching.....	30	866	363,392	59,988	530,164	470,176
Factories making buttonholes.....	4	34	15,943	4,921	30,456	25,535
Factories doing crimping.....	5	10	8,495	718	17,384	16,668
Factories making overgaiters, moccasins, leggings, etc.....	53	1,182	457,872	1,712,089	2,830,430	1,118,341

Exports of boots and shoes.—Table 7 shows the value of the exports of leather boots, shoes, and slippers for the fiscal years ending June 30, 1870, 1880, 1890, 1900, and for each succeeding year to 1910, inclusive. (The figures are taken from the Statistical Abstract of the United States.) Exports for the fiscal year 1910, for example, are fairly comparable with the production for the census year 1909.

Table 7

YEAR ENDING JUNE 30—	Value.	YEAR ENDING JUNE 30—	Value.
1910.....	\$12,408,575	1903.....	\$6,665,017
1909.....	10,305,814	1902.....	6,182,098
1908.....	11,469,559	1901.....	5,526,290
1907.....	10,666,949	1900.....	4,276,656
1906.....	9,142,748	1890.....	662,974
1905.....	8,057,697	1880.....	441,069
1904.....	7,238,940	1870.....	419,612

SUMMARY BY STATES.

Table 8 summarizes the more important statistics for "boots and shoes, including cut stock and findings," by states, the states being arranged according to the value of products reported for 1909. The states are given their actual ranking in this table, consideration being given to the rank of those states for which figures can not be shown. In considering the rank in value of products, it should be borne in mind that there may be more duplication of value in some states than in others.

Although statistics are shown in Table 8 for 26 states separately, more than nine-tenths of the total value of products was reported by the 9 states first named, each of which had products valued at more than \$10,000,000 in 1909.

Table 8

BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS.

STATE.	Number of estab-lish-ments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.		
											1909	1904	1899	1904	1899	1904	1899	1904	1899
United States.....	1,818	198,297	100.0	.....	\$512,797,642	100.0	.....	\$180,059,429	100.0	.....	31.1	23.7	6.0	78.8	43.4	23.3	82.6	36.0	34.3
Massachusetts.....	860	83,063	41.9	1	236,342,915	46.1	1	83,352,963	46.3	1	27.3	18.4	7.6	87.3	36.1	23.0	76.6	32.2	33.7
Missouri.....	59	17,396	8.8	3	48,751,235	9.5	2	14,211,534	7.9	3	101.3	.....	.....	325.5	.....	.....	326.4	.....	.....
New York.....	286	21,627	10.9	2	48,185,814	9.4	3	19,211,403	10.7	2	29.9	24.2	4.6	71.4	28.4	33.4	77.7	27.0	39.9
New Hampshire.....	68	14,211	7.2	5	39,439,544	7.7	4	11,224,404	6.2	5	14.5	32.3	-13.5	66.0	72.7	-3.9	50.2	58.4	0.5
Ohio.....	72	16,026	8.1	4	31,550,957	6.2	5	12,678,950	7.0	4	25.5	14.2	9.9	72.9	22.6	41.0	82.8	18.0	54.9
Pennsylvania.....	140	10,822	5.5	6	20,218,784	3.9	6	8,155,002	4.5	6	17.0	20.4	-2.8	46.2	35.8	7.6	58.4	36.4	16.1
Illinois.....	53	5,732	2.9	8	18,754,704	3.3	7	5,885,862	3.3	7	20.9	36.3	-11.3	59.6	67.7	-4.8	76.3	64.5	7.2
Maine.....	55	6,626	3.3	7	15,508,771	3.0	8	5,568,266	3.1	8	.....	11.4	.....	23.0	.....	.....	33.4	.....	.....
Wisconsin.....	68	5,431	2.7	9	13,602,234	2.7	9	4,849,398	2.7	9	84.6	55.4	18.8	162.1	98.7	31.9	178.7	99.8	39.5
New Jersey.....	53	4,232	2.1	10	8,041,623	1.6	10	3,314,498	1.8	10	-8.6	-6.5	-2.3	7.0	6.0	0.9	8.3	-2.2	10.7
Minnesota.....	18	2,664	1.3	12	7,567,582	1.5	11	2,632,985	1.5	11	31.6	55.4	-15.4	109.3	81.5	15.3	112.7	71.2	24.2
Virginia.....	10	2,711	1.4	11	5,809,503	1.1	12	1,788,999	1.0	13	135.1	.....	.....	300.1	.....	.....	512.7	.....	.....
Michigan.....	23	2,455	1.2	13	6,255,960	1.0	13	1,908,655	1.1	12	119.8	42.5	54.3	174.5	48.9	84.4	154.2	26.0	101.7
Kentucky.....	13	428	0.2	19	3,247,825	0.6	14	803,488	0.4	15	.....	.....	.....	.....	.....	.....	.....	.....	.....
California.....	18	695	0.4	15	1,924,278	0.4	15	804,454	0.4	14	.....	-1.8	.....	.....	11.0	.....	.....	.....	9.5
Connecticut.....	10	520	0.3	17	1,657,678	0.3	16	569,331	0.3	17	-27.7	4.2	-30.6	9.3	25.7	-13.1	7.5	14.2	-5.8
Iowa.....	10	716	0.4	14	1,632,911	0.3	17	573,798	0.3	16	26.5	.....	.....	107.8	.....	.....	105.7	.....	.....
Maryland.....	14	594	0.3	16	1,431,017	0.3	18	518,845	0.3	18	-35.4	-12.8	-25.9	13.5	37.6	-17.5	5.6	5.1	0.4
Tennessee.....	4	374	0.2	20	1,180,894	0.2	19	353,397	0.2	19	.....	66.2	.....	.....	41.1	.....	.....	.....	79.7
Indiana.....	8	436	0.2	18	977,934	0.2	20	313,591	0.2	20	-31.8	.....	-64.6	4.4	.....	-50.9	21.2	.....	-38.2
Washington.....	12	172	0.1	23	611,131	0.1	21	153,739	0.1	23	.....	.....	.....	263.1	.....	.....	.....	.....	.....
Louisiana.....	13	278	0.1	21	516,789	0.1	22	213,774	0.1	21	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Carolina.....	7	178	0.1	22	408,079	0.1	23	166,498	0.1	22	.....	.....	.....	.....	119.4	.....	.....	.....	.....
Oregon.....	8	86	(²)	31	155,507	(²)	30	80,504	(²)	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rhode Island.....	6	65	(²)	30	142,080	(²)	31	85,111	0.1	29	.....	.....	.....	-57.6	.....	.....	-28.0	.....	.....
Texas.....	6	36	(²)	32	102,133	(²)	32	63,810	(²)	32	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	17	695	0.4	.....	1,780,754	0.3	.....	606,170	0.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 29. A minus sign (-) denotes decrease. Per cent not shown where base is less than 100 for wage earners, or is less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.
² Less than one-tenth of 1 per cent.

Massachusetts, the leading state in the industry, reported 46.1 per cent of the total value of products, as compared with 9.5 per cent for Missouri, the state second in rank. Missouri has, however, made great progress in this industry, advancing from twelfth rank in value of products in 1879 to second in 1909. By

number of wage earners and value added by manufacture Missouri ranked third and New York second. North Carolina made a marked advance in rank in value of products, going from twenty-seventh place in 1904 to twenty-third in 1909. Most of the other states had the same or practically the same rank in 1909 that they held in 1904, and in general the states had in 1909 the same, or nearly the same, rank in number of wage earners and value added by manufacture as in value of products.

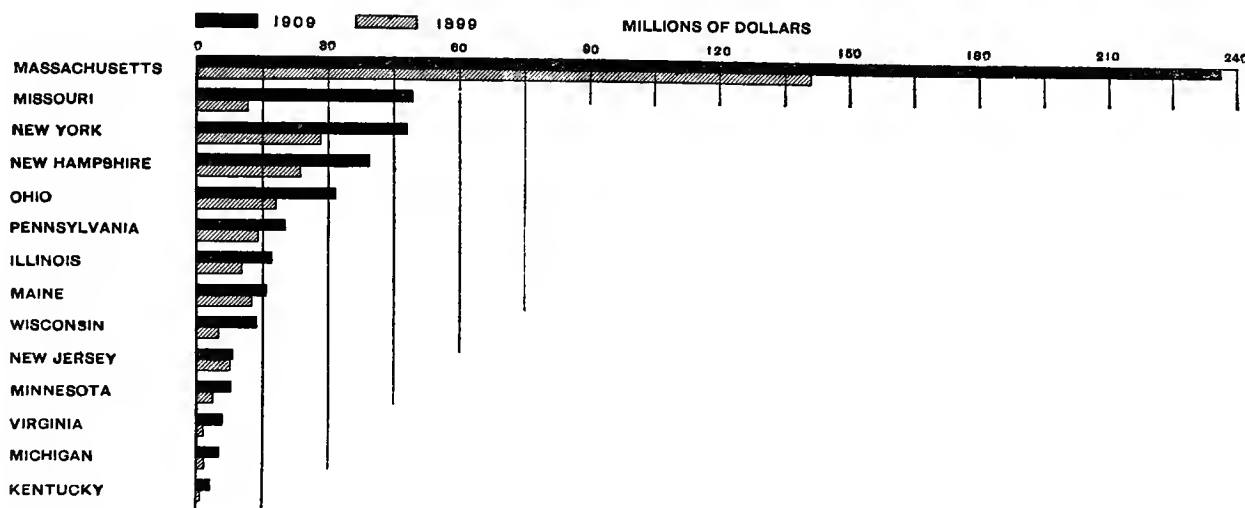
For the decade 1899-1909, as shown by Tables 8 and 29, several states show remarkable percentages of increase, some of the most important of which were as follows: In average number of wage earners, Oregon, 409.1 per cent; and North Carolina, 345 per cent. In

value of products, North Carolina, 458.9 per cent; Missouri, 325.5 per cent; Virginia, 300.1 per cent; Washington, 268.1 per cent; Oregon, 254.6 per cent; and Wisconsin, 162.1 per cent. In value added by manufacture, North Carolina, 730 per cent; Oregon, 306.7 per cent; and Wisconsin, 178.7 per cent. The industry in several of these states, however, is comparatively unimportant.

In Massachusetts the number of wage earners increased 27.3 per cent during the decade, the value of products 67.3 per cent, and the value added by manufacture 76.6 per cent.

The following diagram shows graphically the value of products reported for the most important states in the industry in 1909 and 1899.

BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS—VALUE OF PRODUCTS FOR LEADING STATES: 1909 AND 1899.



SUMMARY FOR LEADING CITIES.

Table 9 shows the value of products for the industry as a whole in each of the 17 cities which had a value of products in 1909 amounting to \$5,000,000 or over

for which comparative figures are available, and also their rank in value of products in 1909, 1904, 1899. The ranking relates only to the cities shown in the table.

CITY.	BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS.								
	1909		1904		1899		Per cent of increase. ¹		
	Value of products.	Rank.	Value of products.	Rank.	Value of products.	Rank.	1899-1909	1904-1909	1899-1904
Lynn, Mass.....	\$46,659,709	1	\$35,430,532	1	\$24,981,636	1	86.8	31.7	41.8
Brockton, Mass.....	39,293,118	2	33,853,128	2	22,068,276	2	78.1	16.1	53.4
St. Louis, Mo.....	33,970,372	3	19,662,388	4	8,487,020	6	300.3	72.8	131.7
Haverhill, Mass.....	29,140,609	4	20,508,325	3	19,538,388	3	49.2	42.1	5.0
Boston, Mass.....	26,146,755	5	11,413,510	6	7,307,120	7	257.8	129.1	56.2
New York, N. Y.....	18,376,429	6	13,086,605	5	10,641,104	4	72.7	34.3	28.6
Manchester, N. H.....	17,046,652	7	6,567,903	10	4,052,204	12	335.5	168.7	62.1
Cincinnati, Ohio.....	14,993,672	8	11,152,013	7	8,626,004	5	73.9	34.5	29.3
Rochester, N. Y.....	13,450,155	9	9,154,944	8	7,297,408	8	84.3	46.9	25.5
Chicago, Ill.....	9,855,302	10	6,558,350	11	6,813,763	9	44.6	50.2	-3.7
Marlborough, Mass.....	9,565,993	11	6,033,505	9	3,867,368	14	147.4	44.2	71.5
Milwaukee, Wis.....	7,800,390	12	3,181,884	17	2,593,278	17	200.8	145.2	22.7
Philadelphia, Pa.....	6,517,371	13	5,385,634	13	6,394,686	10	1.9	21.0	-15.8
Salem, Mass.....	6,449,008	14	4,635,492	14	3,947,793	13	63.4	39.1	17.4
Auburn, Me.....	6,312,029	15	4,274,069	15	4,261,406	11	48.1	47.7	0.3
Columbus, Ohio.....	5,435,709	16	5,425,087	12	3,505,128	15	55.1	0.2	54.8
Portsmouth, Ohio.....	5,300,473	17	4,258,855	16	3,043,916	16	74.1	24.5	40.0

¹ A minus sign (-) denotes decrease.

These 17 cities reported 57.9 per cent of the total value of products for the industry in 1909, as compared with 50.8 per cent in 1899. The 11 cities in the eastern section of the country reported 73.9 per cent of the total value of products for the 17 cities in 1909, as compared with 77.6 per cent in 1899, the 6 western cities correspondingly increasing their proportion.

Except for Lynn and Brockton, none of the 17 cities held the same rank in 1909 as in 1899. During the decade 1899-1909 the most marked gains in rank were made by St. Louis, which rose from sixth place to third; Manchester, which rose from twelfth to seventh; Milwaukee, from seventeenth to twelfth; and Marlborough, from fourteenth to eleventh. Pronounced losses in rank during the decade are shown for Auburn, which fell from eleventh to fifteenth; Cincinnati, which fell from fifth to eighth; and Philadelphia, which fell from tenth to thirteenth. St. Louis shows the greatest absolute gain during the decade in value of products, \$25,483,352, or 300.3 per cent. Manchester, although making a much smaller absolute gain than St. Louis, shows a higher percentage of increase during the decade, 335.5 per cent.

PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 10 shows, by classes, for 1909, the number of persons engaged in the industry as a whole and in each of the three branches, classified according to occupational status and sex, and in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction; but in an industry of such steady employment the estimates should be substantially correct.

The average number of persons engaged in the industry as a whole during 1909 was 215,923, of whom 198,297, or 91.8 per cent, were wage earners; 11,874, or 5.5 per cent, clerks, including other subordinate salaried employees; and 5,752; or 2.7 per cent, proprietors and officials. Of the total number of wage earners, 65 per cent were males and 35 per cent females. The 8,099 children under 16 years of age formed 4.1 per cent of the total number of wage earners. Of the total number of wage earners, 93.4 per cent were in the boot and shoe branch of the industry, 3.4 per cent in the cut-stock branch, and 3.3 per cent in establishments engaged chiefly in the manufacture of findings. Women over 16 years of age formed 33.7 per cent of the wage earners in the boot and shoe industry proper, 30.8 per cent in the establishments engaged primarily in the manufacture of findings, and 25.1 per cent in those manufacturing chiefly cut stock. There were no great differences among the three branches of the industry as to the relative numbers of women and children employed.

BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS.			
All classes.....	215,923	141,205	74,718
Proprietors and officials.....	5,752	5,500	252
Proprietors and firm members.....	1,838	1,755	83
Salaried officers of corporations.....	1,027	1,006	21
Superintendents and managers.....	2,887	2,739	148
Clerks.....	11,874	8,867	5,007
Wage earners (average number).....	198,297	128,838	69,459
16 years of age and over.....	190,198	124,141	66,057
Under 16 years of age.....	8,099	4,697	3,402
BOOTS AND SHOES.			
All classes.....	200,847	130,398	70,449
Proprietors and officials.....	4,678	4,467	211
Proprietors and firm members.....	1,218	1,165	53
Salaried officers of corporations.....	890	875	15
Superintendents and managers.....	2,570	2,427	143
Clerks.....	11,053	6,428	4,625
Wage earners (average number).....	185,116	119,503	65,613
16 years of age and over.....	177,500	115,119	62,381
Under 16 years of age.....	7,616	4,384	3,232
BOOT AND SHOE CUT STOCK.			
All classes.....	7,535	5,598	1,939
Proprietors and officials.....	457	444	13
Proprietors and firm members.....	255	244	11
Salaried officers of corporations.....	55	53	2
Superintendents and managers.....	147	147	.....
Clerks.....	385	225	160
Wage earners (average number).....	6,693	4,927	1,766
16 years of age and over.....	6,411	4,732	1,679
Under 16 years of age.....	282	195	87
BOOT AND SHOE FINDINGS.			
All classes.....	7,541	5,211	2,330
Proprietors and officials.....	617	589	28
Proprietors and firm members.....	365	346	19
Salaried officers of corporations.....	82	78	4
Superintendents and managers.....	170	165	5
Clerks.....	436	214	222
Wage earners (average number).....	6,488	4,408	2,080
16 years of age and over.....	6,287	4,290	1,997
Under 16 years of age.....	201	118	83

Sex and age distribution of wage earners, by states: 1909.—The average number of wage earners for each state, in the industry as a whole, for the censuses of 1909, 1904, and 1899, is given in Table 29. The average number distributed by sex and age is not shown for the individual states, but Table 28 gives the number employed on December 15, or the nearest representative day, distributed on this basis.

The absolute number of women 16 years of age and over in the boot and shoe industry in Massachusetts in 1909 was 28,922; in New York, 7,847; in Ohio, 7,023; and in Missouri, 5,801. No other state reported as many as 5,000. The number of children under 16 in Massachusetts was 3,335; in Missouri, 1,392; in Pennsylvania, 806; and in Ohio, 589, no other state reporting as many as 500.

Table 11 shows, for each of the 17 leading states in the boot and shoe industry, by percentages, the distribution according to sex and age of the wage earners employed December 15, 1909, or the nearest representative day.

STATE.	16 years of age and over.		Under 16 years of age.		
	Male.	Female.	Total.	Male.	Female.
	United States.....	62.6	33.3	4.1	2.4	1.7
California.....	69.2	25.2	5.7	4.8	0.9
Connecticut.....	45.1	53.5	1.4	1.1	0.3
Illinois.....	61.2	33.0	5.8	3.0	2.8
Iowa.....	52.8	43.7	3.4	2.6	0.8
Maine.....	65.3	33.0	1.7	1.3	0.4
Maryland.....	58.9	31.7	9.3	6.3	3.0
Massachusetts.....	64.1	32.2	3.7	2.2	1.5
Michigan.....	58.5	35.1	6.4	3.9	2.5
Minnesota.....	63.8	35.7	0.5	0.2	0.3
Missouri.....	60.6	31.8	7.6	4.7	3.0
New Hampshire.....	66.3	31.3	2.4	1.4	1.0
New Jersey.....	60.8	36.3	2.9	1.6	1.3
New York.....	63.6	34.3	2.0	1.1	0.9
Ohio.....	55.5	41.0	3.4	1.5	2.0
Pennsylvania.....	58.5	34.4	7.1	4.0	3.1
Virginia.....	73.6	21.8	4.6	2.7	1.9
Wisconsin.....	57.7	33.7	8.6	5.0	3.6

In all of the states listed women (16 years of age and over) formed in 1909 a very considerable proportion of the total number of wage earners, the lowest proportion, 21.8 per cent, being reported from Virginia, and the highest, 53.5 per cent, from Connecticut. In Massachusetts, the most important state in the industry, 32.2 per cent of the wage earners were women, and in Missouri, the next state in importance, 31.8 per cent.

The proportion of children under 16 years of age among the total number of wage earners varied very materially from state to state. The lowest proportion for any state covered by the table was that in Minnesota, five-tenths of 1 per cent, and the highest that in Maryland, 9.3 per cent. In Massachusetts 3.7 per cent of the wage earners were under 16 years of age, and in Missouri 7.6 per cent.

Comparison with previous censuses, for the United States as a whole.—In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 12 for the industry as a whole.

Although there was an increase of 23.7 per cent in the average number of wage earners in the industry as a whole between 1904 and 1909, they constituted a smaller proportion of the total number of persons engaged in the industry in 1909 than in 1904. There was an increase of 65.9 per cent in the number of salaried employees, but the number of proprietors and firm members decreased.

CLASS.	1909		1904		Per cent of increase: ¹ 1904-1909
	Number.	Percent distribution.	Number.	Percent distribution.	
	Total.....	215,923	100.0	171,940		100.0	25.6
Proprietors and firm members.....	1,838	0.9	2,128	1.2	-13.6
Salaried employees.....	15,788	7.3	8,618	5.0	65.9
Wage earners (average number).....	198,297	91.8	160,204	93.2	23.7

¹ A minus sign (-) denotes decrease.

Table 13 shows the average number of wage earners in the industry as a whole, distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. As already explained, the distribution for 1909 is estimated on the basis of the actual numbers reported for a single representative day (see Introduction).

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
	Total.....	198,297	100.0	160,204	100.0	151,231	100.0
16 years of age and over.....	190,198	95.9	154,815	96.6	146,491	96.9
Male.....	124,141	62.6	101,828	63.5	96,175	63.6
Female.....	66,057	33.3	52,987	33.1	50,316	33.3
Under 16 years of age.....	8,099	4.1	5,479	3.4	4,740	3.1

Wage earners employed, by months.—Table 14 gives, for the industry as a whole, the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909, for the 17 states in which at least 500 wage earners were employed on the average during the year.

In the United States the largest number of wage earners employed in this industry during any month of 1909 was 207,452, in December, and the smallest number 190,382, in May, the minimum number forming 91.8 per cent of the maximum number. The industry is not subject to great fluctuations from month to month. In 1904 March was the month of greatest employment, although the number for that month (163,598) was but little greater than the number for December (162,891). May was the month of least employment (154,961, or 94.7 per cent of the maximum) in 1904. The month of maximum employment in 1909 is shown to have been December in 9 of the 17 states listed, among which are 6 of the most important; in 2, California and New Hampshire, it was November, while in Connecticut the maximum number was reported for both November and March; and in 2, Illinois and Maine, it was February. The months of minimum employment in most states occurred between January and July.

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	198,297	199,019	202,095	199,778	192,507	190,382	192,119	195,929	200,194	199,572	193,556	200,977	207,452
California.....	695	737	733	728	658	663	556	<i>542</i>	733	733	749	754	751
Connecticut.....	520	498	534	538	515	527	535	517	<i>498</i>	505	511	538	531
Illinois.....	5,792	5,757	5,981	5,910	5,768	5,647	<i>5,572</i>	5,742	5,805	5,715	5,811	5,863	5,942
Iowa.....	716	704	716	702	691	690	749	778	746	<i>656</i>	712	725	724
Maine.....	6,626	7,017	7,274	7,140	6,528	6,363	6,225	<i>6,190</i>	6,632	6,566	6,390	6,473	6,714
Maryland.....	594	578	586	612	613	583	<i>555</i>	594	606	613	604	594	594
Massachusetts.....	83,063	84,142	85,019	84,324	81,110	<i>78,558</i>	78,680	81,349	83,759	83,945	83,819	84,282	87,737
Michigan.....	2,455	2,414	2,477	2,497	2,407	<i>2,395</i>	2,396	2,409	2,428	2,453	2,493	2,546	2,547
Minnesota.....	2,664	2,701	2,788	2,727	2,477	<i>2,457</i>	2,496	2,606	2,728	2,687	2,706	2,764	2,854
Missouri.....	17,396	17,582	17,754	17,725	17,236	<i>16,820</i>	16,856	17,472	17,174	17,374	17,023	17,525	18,223
New Hampshire.....	14,211	13,752	13,850	13,864	13,810	<i>13,744</i>	14,245	14,169	14,545	14,262	14,837	15,200	14,253
New Jersey.....	4,232	4,214	4,263	4,256	<i>4,186</i>	4,202	4,263	4,171	4,286	4,193	4,178	4,272	4,366
New York.....	21,627	<i>20,655</i>	22,364	22,446	21,463	21,292	21,519	21,500	21,808	21,550	21,406	20,674	22,755
Ohio.....	16,026	16,839	16,055	14,782	<i>13,380</i>	15,236	16,084	16,508	16,586	16,446	16,298	16,565	17,033
Pennsylvania.....	10,822	10,685	10,852	10,685	<i>10,669</i>	10,694	10,761	10,762	10,885	10,857	10,885	11,036	11,093
Virginia.....	2,711	2,700	<i>2,648</i>	2,673	2,658	2,689	<i>2,768</i>	2,734	2,767	2,762	2,698	2,735	2,702
Wisconsin.....	5,431	5,571	5,574	5,569	5,245	5,237	5,217	<i>5,178</i>	5,407	5,434	5,508	5,528	5,694

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

Prevailing hours of labor.—In Table 15 are presented statistics for the wage earners in the industry as a whole, classified according to the prevailing hours of labor per week in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total, according to the hours prevailing in that establishment, even though a few employees worked a greater or a smaller number of hours.

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	198,297	696	6,578	47,811	113,642	29,539	221	12
California.....	695	.....	.....	641	.....	35	19	.....
Connecticut.....	520	.....	.....	40	480	.....	.....	.....
Illinois.....	5,792	6	57	673	3,956	1,100	.....	.....
Iowa.....	716	.....	.....	9	645	62	.....	.....
Maine.....	6,626	1	171	268	4,775	1,411	.....	.....
Maryland.....	594	1	67	.....	120	402	.....	.....
Massachusetts.....	83,063	212	4,258	33,007	44,563	1,023	.....	.....
Michigan.....	2,455	6	11	1,074	572	192	.....	.....
Minnesota.....	2,664	.....	4	8	1,732	920	.....	.....
Missouri.....	17,396	4	.....	2,464	9,917	5,011	.....	.....
New Hampshire.....	14,211	.....	12	136	12,459	1,604	.....	.....
New Jersey.....	4,232	14	12	71	3,680	455	.....	.....
New York.....	21,627	77	1,110	4,851	10,057	5,441	85	6
Ohio.....	16,026	190	305	2,608	9,106	3,817	.....	.....
Pennsylvania.....	10,822	21	462	514	8,568	1,140	117	.....
Virginia.....	2,711	.....	.....	.....	503	2,208	.....	.....
Wisconsin.....	5,431	3	28	430	1,458	3,512	.....	.....

A majority (57.3 per cent) of the wage earners were employed in establishments in which the prevailing hours of employment were more than 54 but less than 60 per week, and 96.2 per cent were employed in establishments in which the prevailing hours of employment were either 54, between 54 and 60, or 60 per week. Only 233 worked in establishments where the prevailing hours of employment were more than 60 per week, and only 7,272 were employed where the prevailing hours were less than 54 per week. In every state

listed, except Maryland, Michigan, Virginia, and Wisconsin, the wage earners in establishments working between 54 and 60 hours per week greatly outnumbered those in any other group.

CHARACTER OF OWNERSHIP.

Table 16 presents data with respect to the character of ownership of establishments in the industry "boots and shoes, including cut stock and findings," for the United States as a whole.

CHARACTER OF OWNERSHIP.	Number of establishments.				Value of products.	
	1909		1904		1909	1904
	1909	1904	1909	1904	1909	1904
Total	1,918	1,895	\$512,797,642	\$357,638,180		
Individual.....	746	¹ 776	44,254,493	40,617,859		
Firm.....	¹ 438	558	102,826,471	106,576,608		
Corporation.....	734	561	365,716,678	210,493,693		
Per cent of total	100.0	100.0	100.0	100.0		
Individual.....	38.9	¹ 40.9	8.6	11.4		
Firm.....	22.8	29.4	20.1	29.8		
Corporation.....	38.3	29.6	71.3	58.8		

¹ Includes one establishment under cooperative ownership, to avoid disclosure of individual operations.

The most important distinction shown is that between corporate and all other forms of ownership. In 1909, of the total number of establishments, 38.3 per cent were under corporate ownership, as compared with 29.6 per cent in 1904. While corporations in 1909 thus controlled less than two-fifths of the total number of establishments, the value of the products of these establishments represented 71.5 per cent of the total value of products in that year; the corresponding proportion in 1904 was 58.8 per cent. Between 1904 and 1909 there was an actual decrease in the number of establishments under individual ownership, but an increase in the value of products of such establishments, while for firm ownership there was an absolute decrease in both respects.

Table 17 gives statistics for 1909 for establishments classified according to form of ownership in each of the 17 leading states. In 1909, of the entire number of wage earners, 17,557, or 8.9 per cent, were employed

in establishments under individual ownership; 38,595, or 19.5 per cent, in those under firm ownership; and 142,145, or 71.9 per cent, in those controlled by corporations.

Table 17

BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS: 1909

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	746	438	734	17,557	38,595	142,145	\$44,254,493	\$102,828,471	\$385,716,678	\$16,757,288	\$38,074,645	\$127,227,498
California.....	3	5	10	29	39	627	72,359	77,844	1,774,075	37,764	41,424	725,266
Connecticut.....	2	6	2	(X)	520	(X)	(X)	1,667,678	(X)	(X)	669,531	(X)
Illinois.....	17	9	27	510	399	4,883	1,516,025	815,241	14,423,438	595,983	301,945	4,987,934
Iowa.....	2		8	(X)		716	(X)		1,632,911	(X)		873,798
Maine.....	8	8	39	43	1,281	5,302	76,980	2,788,315	12,643,476	37,250	980,071	4,550,945
Maryland.....	9	1	4	363	(X)	231	624,402	(X)	806,615	264,010	(X)	254,835
Massachusetts.....	399	225	236	10,663	16,956	55,444	30,483,211	55,361,516	150,498,188	11,107,991	18,529,205	53,715,767
Michigan.....	5	2	16	32	(X)		77,203	(X)	5,173,763	56,345	(X)	1,873,310
Minnesota.....	4		14	110		2,554	329,168		7,233,414	131,643		2,501,342
Missouri.....	5	3	51	34	271	17,091	75,418	646,912	48,028,905	47,749	184,273	13,979,512
New Hampshire.....	21	17	30	1,247	3,500	9,464	2,110,765	8,821,701	28,507,078	789,491	3,048,829	7,386,084
New Jersey.....	21	11	21	352	940	2,940	846,281	1,706,865	5,488,477	262,084	750,971	2,301,443
New York.....	143	61	87	2,602	7,155	11,870	5,359,600	17,534,152	25,292,122	2,290,683	6,366,057	10,584,663
Ohio.....	8	13	51	307	1,852	13,867	514,920	3,360,551	27,675,486	218,034	1,512,723	10,948,193
Pennsylvania.....	44	47	49	807	3,208	6,807	1,277,840	6,167,516	12,773,428	547,870	2,487,915	5,119,217
Virginia.....	1	2	7	(X)	(X)	2,711	(X)	(X)	6,808,603	(X)	(X)	1,788,999
Wisconsin.....	16	4	48	191	117	5,123	365,121	264,291	12,972,822	139,064	109,846	4,600,488

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under another form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. One establishment under cooperative ownership is included with those under firm ownership.

There was a considerable variation among the states in the relative importance of the establishments operated by individuals, firms, and corporations, respectively, but, as measured by value of products, corporate ownership predominated to a greater or less degree in all of the 17 states for which statistics are shown. In Massachusetts, the principal boot and shoe producing state, corporations in 1909 controlled 27.4 per cent of the establishments, gave employment to 66.7 per cent of the wage earners, and reported 63.7 per cent of the value of products. In Missouri, however, in which the industry is relatively much younger, corporations controlled 86.4 per cent of the establishments, employed 98.2 per cent of the number of wage earners and reported 98.5 per cent of the value of products. In New York corporations reported a smaller proportion (52.5 per cent) of the total value of products than in most other states, but the proportion for firm ownership was the largest shown, 36.4 per cent. For individual ownership the proportion in New York was 11.1 per cent—even lower than in Massachusetts.

ESTABLISHMENTS CLASSIFIED ACCORDING TO SIZE.

Classification according to value of products.—Table 18, relating to the entire industry in the United States, presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

Among the 1,918 establishments reported in 1909 there were 135, or 7 per cent, whose products were valued at \$1,000,000 and over, while in 1904, exclusive of 3 establishments, statistics for which are not shown in the table, there were 62 out of a total of

1,895. Although these establishments represented a comparatively small proportion of the total number of establishments, they reported a large proportion of the value of products—47.7 per cent in 1909 and 33.3 per cent in 1904. The large establishments thus gained materially in their proportion of the business, the other classes losing correspondingly. It should be noted, however, that this change may in part be the result merely of an advance in prices, by reason of which an establishment, without increasing the quantity of its output, might have passed from a lower class into a higher.

The small establishments—that is, those manufacturing products valued at less than \$20,000—constituted about one-third (32.2 per cent) of the total number of establishments in 1909, but reported only 1 per cent of the total value of products.

Table 18

BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS.

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	1,918	1,895	\$512,797,842	\$357,688,160
Less than \$5,000.....	218	1,224	621,288	578,522
\$5,000 and less than \$20,000.....	399	437	4,506,865	4,694,030
\$20,000 and less than \$100,000.....	494	534	24,133,865	25,898,215
\$100,000 and less than \$1,000,000.....	672	596	238,988,182	203,481,505
\$1,000,000 and over.....	135	* 62	244,547,642	119,079,802
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	11.4	* 11.8	0.1	0.2
\$5,000 and less than \$20,000.....	20.8	23.1	0.9	1.3
\$20,000 and less than \$100,000.....	25.8	28.2	4.7	7.2
\$100,000 and less than \$1,000,000.....	35.0	31.5	46.6	56.9
\$1,000,000 and over.....	7.0	* 3.3	47.7	33.3

* Excluding statistics for 39 establishments, to avoid disclosure of individual operations.

* Excluding statistics for 3 establishments, to avoid disclosure of individual operations.

The average value of products per establishment increased from \$188,754 in 1904 to \$267,361 in 1909, and, as computed from Table 2, the average value added by manufacture per establishment increased from \$69,868 to \$93,879. The average number of wage earners per establishment increased from 85 to 103.

Classification according to number of wage earners.— In some respects, and especially from the standpoint

of conditions under which persons engaged in the industry work, the best method of bringing out the feature of size is a classification according to the number of wage earners employed. Table 19 gives such a classification of the establishments in the industry as a whole in each of the 17 states for which more than 500 wage earners were reported at the census of 1909.

Table 19

STATE.	BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS.																		
	Total.		Establishments employing in 1909—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
Es-tab-lish-ments	Wage earners (average number)	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners	Es-tab-lish-ments	Wage earners
United States.....	1,918	198,297	49	417	1,189	422	4,987	305	10,094	233	17,174	258	42,127	156	55,564	62	43,248	18	23,914
California.....	18	695	.....	6	23	5	61	1	41	3	205	3	365	.....	.....	.....	.....	.....	.....
Connecticut.....	10	520	2	1	5	2	20	2	59	1	55	2	381	.....	.....	.....	.....	.....	.....
Illinois.....	53	5,792	1	12	30	9	120	10	371	5	402	9	1,531	4	1,416	3	1,922	.....	.....
Iowa.....	10	716	.....	1	4	3	29	2	59	2	135	1	153	1	336	.....	.....	.....	.....
Maine.....	55	6,626	1	13	30	4	54	10	357	7	557	11	1,957	8	2,991	1	680	.....	.....
Maryland.....	14	594	1	4	9	1	12	3	86	3	231	2	256	.....	.....	.....	.....	.....	.....
Massachusetts.....	860	83,063	20	191	584	219	2,618	154	4,997	78	5,645	96	15,279	72	26,230	22	14,618	8	13,092
Michigan.....	23	2,455	.....	6	20	3	25	2	67	6	459	4	611	1	275	.....	.....	.....	.....
Minnesota.....	18	2,664	.....	3	10	2	15	2	78	5	402	2	239	3	1,295	1	625	.....	.....
Missouri.....	59	17,396	3	4	13	5	74	1	23	5	437	14	2,600	19	6,419	6	4,380	2	3,450
New Hampshire.....	68	14,211	.....	2	9	8	112	12	398	13	936	13	2,367	12	3,892	6	4,294	2	2,203
New Jersey.....	53	4,232	4	7	14	13	146	9	296	8	592	7	1,215	4	1,420	1	549	.....	.....
New York.....	296	21,627	10	94	260	72	865	39	1,313	29	2,194	30	4,890	11	3,790	10	7,156	1	1,159
Ohio.....	72	16,026	1	4	10	11	118	5	162	10	739	23	3,885	9	3,303	7	4,908	2	2,901
Pennsylvania.....	140	10,822	1	23	56	33	409	28	1,036	24	1,733	21	3,329	8	2,863	2	1,396	.....	.....
Virginia.....	10	2,711	.....	1	3	1	6	1	31	2	140	2	277	1	343	1	802	1	1,109
Wisconsin.....	68	5,431	.....	13	25	11	136	14	435	13	917	13	2,007	3	990	1	921	.....	.....

In 1909, of the total number of factories in the industry, 43.7 per cent employed from 1 to 20 wage earners, 41.5 per cent employed from 21 to 250, and 12.2 per cent more than 250. There were 49 establishments, or 2.6 per cent, that reported no wage earners. Most of the large factories were in Massachusetts, Missouri, New Hampshire, and New York.

Of the total number of wage earners, 61.9 per cent were reported by establishments employing more than 250 wage earners each, 21.2 per cent by establishments employing from 101 to 250 wage earners, 13.8 per cent by those employing from 21 to 100, and 3.1 per cent by those employing from 1 to 20.

EXPENSES.

As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of depreciation, and consequently can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported.

Table 2 shows the total reported expenses in the combined industry to have been \$477,843,146, divided as follows: Materials, \$332,738,213, or 69.6 per cent; wages, \$98,462,695, or 20.6 per cent; salaries, \$18,629,421, or 3.9 per cent; and miscellaneous expenses, made up of traveling expenses, advertising, ordinary repairs

of buildings and machinery, insurance, and other sundry expenses, \$28,012,817, or 5.9 per cent. The large proportion shown for cost of materials is due partly to duplication, the products of certain establishments in the industry being used as materials by other establishments.

Considerable differences exist among the three branches of the industry with respect to the distribution of expenses. For establishments engaged primarily in the manufacture of boots and shoes the proportions of the total expenses formed by the several classes were as follows: Materials, 67.2 per cent; wages, 22.4 per cent; salaries, 4.2 per cent; and miscellaneous, 6.2 per cent. For establishments engaged primarily in the manufacture of cut stock the proportions were: Materials, 88.3 per cent; wages, 7.5 per cent; salaries, 1.5 per cent; and miscellaneous, 2.6 per cent. For establishments engaged primarily in the manufacture of findings the corresponding proportions were 79.1 per cent, 12.7 per cent, 3 per cent, and 5.2 per cent, respectively.

Necessarily there are variations among the several states in the distribution of expenses. Table 20 shows the percentages formed by the several items of expense, in 13 of the principal states, for 1909; the absolute numbers are shown in Table 28. The figures relate to all three branches of the industry combined.

For Kentucky, wages represented only 5.3 per cent of the total expenses, while miscellaneous expenses

formed a high proportion (12.4 per cent). In this state the manufacture of boots and shoes is largely carried on in the penal institutions, and in such cases the amount paid for convict labor is reported as "contract work" under "miscellaneous expenses," and the employees are not shown in the census reports of manufactures as wage earners. Similar conditions, although to a lesser extent, prevail in Maryland. Variations appear in other states, due to differences in the relative importance of the three branches of the industry, in the amount of duplication in cost of materials, in the class of goods produced, in the kind of labor employed, and in other conditions.

Table 20

STATE.	PER CENT OF TOTAL EXPENSES FOR BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS: 1909			
	Salaries.	Wages.	Materials.	Miscellaneous expenses.
United States.....	3.9	20.8	69.6	5.8
Illinois.....	4.5	20.3	70.2	5.0
Kentucky.....	6.5	5.3	75.8	12.4
Maine.....	4.7	21.8	67.6	5.9
Maryland.....	4.7	17.6	66.9	10.8
Massachusetts.....	3.0	21.1	70.1	5.8
Minnesota.....	5.6	17.8	68.0	8.7
Missouri.....	3.1	17.5	74.2	5.1
New Hampshire.....	2.3	18.4	75.4	3.9
New Jersey.....	6.0	25.6	63.0	5.4
New York.....	5.0	23.8	64.5	6.7
Ohio.....	7.2	22.5	63.9	6.3
Pennsylvania.....	6.3	23.1	65.4	5.1
Wisconsin.....	5.1	17.9	70.0	6.9

ENGINES AND POWER.

Table 21 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current) and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishments using them.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
	Primary power, total.	3,074	833	926	36,302	63,968	65,489	100.0	100.0	100.0
Owned.....	786	833	925	67,119	49,358	42,728	69.7	77.2	77.0
Steam.....	604	649	752	60,772	44,387	38,621	63.1	69.4	69.6
Gas.....	147	135	105	3,532	2,676	1,346	3.7	4.2	2.4
Water wheels.....	32	44	68	2,798	2,242	2,663	2.9	3.5	4.8
Water motors.....	3	5	(¹)	17	28	(¹)	(²)	(²)	.....
Other.....	.....	.....	.....	.....	25	98	(²)	(²)	0.2
Rented.....	2,288	.....	.....	29,183	14,610	12,761	30.3	22.8	23.0
Electric.....	2,288	(¹)	(¹)	17,381	5,959	3,823	18.0	9.3	6.9
Other.....	.....	.....	.....	11,802	8,651	8,938	12.3	13.5	16.1
Electric motors.....	3,849	686	123	32,881	12,663	5,625	100.0	100.0	100.0
Run by current generated by establishment.....	1,561	566	123	15,000	6,704	1,702	46.3	62.9	30.8
Run by rented power....	2,288	(¹)	(¹)	17,381	5,959	3,823	53.7	47.1	69.2

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power reported for the industry increased from 55,489 horsepower in 1899 to 96,302 in 1909, an increase of 40,813 horsepower, or 73.6 per cent. There was a great increase in rented electric power, which formed 18 per cent of the total primary power in 1909, as compared with only 6.9 per cent in 1899. The amount of steam power increased 57.4 per cent from 1899 to 1909. The power of gas and other internal-combustion engines and of water wheels used is relatively small.

The number and horsepower of electric motors used for distributing power by means of current generated in the establishments shows a very great increase during the decade.

Table 22 shows for 1909 the amount of each of the several kinds of horsepower and of fuel used in the combined industry in the 17 leading states.

Table 22

STATE.	Number of establishments reporting.	Total horsepower.	Primary horsepower.						Electric horsepower.		Fuel used.					
			Owned by establishments reporting.				Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States.....	1,627	36,302	67,119	60,772	3,532	2,815	17,381	11,802	32,381	15,000	45,089	285,545	2,124	4,313	4,324	128,314
California.....	13	369	142	35	107	.....	227	.....	227	.....	13	160	.....	.....	1,659	254
Connecticut.....	9	235	135	60	75	.....	95	5	95	.....	206	500	.....	.....	1	258
Illinois.....	46	2,770	2,203	2,102	101	.....	412	155	810	398	94	18,054	14	.....	608	1,307
Iowa.....	10	345	265	250	15	.....	80	.....	150	70	30	2,393	5	.....	32	257
Maine.....	47	3,810	3,042	2,432	15	595	633	135	816	183	1,068	8,669	173	1,816	70	.....
Maryland.....	12	252	83	60	23	.....	80	89	80	.....	72	529	.....	.....	2	1,637
Massachusetts.....	762	35,051	20,767	20,429	223	115	6,528	7,756	9,028	2,500	4,134	96,144	1,895	364	622	5,309
Michigan.....	18	786	335	335	.....	.....	451	.....	481	30	5	3,716	15	35	.....	238
Minnesota.....	17	1,411	755	735	20	.....	576	80	1,111	535	1,075	5,615	.....	17	.....	1,179
Missouri.....	53	11,113	9,886	9,821	65	.....	1,152	75	6,228	5,076	184	50,555	2	.....	44	8,989
New Hampshire.....	66	8,582	6,506	5,790	18	698	926	1,150	941	15	14	23,592	.....	1,919	54	212
New Jersey.....	45	1,500	1,396	1,310	86	.....	99	5	194	95	4,020	2,911	10	.....	192	1,314
New York.....	199	10,456	7,623	5,922	494	1,207	2,108	725	2,936	828	22,552	13,103	.....	52	135	23,062
Ohio.....	71	8,925	6,416	4,683	1,733	.....	1,246	1,263	4,003	2,757	844	31,722	.....	.....	31	68,168
Pennsylvania.....	118	4,337	3,729	3,477	252	.....	348	260	1,067	719	9,675	8,428	.....	12	325	3,128
Virginia.....	9	1,410	1,290	1,290	.....	.....	120	.....	1,047	927	18	6,211	.....	.....	.....	863
Wisconsin.....	61	2,923	1,957	1,681	201	75	916	50	1,741	825	934	10,127	10	77	440	3,533
All other states.....	66	2,027	589	360	104	125	1,384	54	1,426	42	151	5,066	.....	21	109	8,006

Of the total number of establishments engaged in the industry, 1,627, or 84.8 per cent, reported power. Many establishments which manufactured findings and cut stock reported no power, and the same was true of a number of small establishments which produced infants' shoes, handmade shoes, and pegged work. Moreover, some establishments have their boots and shoes made under contract in outside shops and themselves use no power. Naturally, the largest amount of horsepower was reported for Massachusetts, Missouri, and New York, the three states showing the largest value of products, the total for these states being 56,620 horsepower, or 58.8 per cent of the total for the United States. Steam power was the most important kind in most of the states for which separate figures are given,

the largest amount, 20,429 horsepower, being shown for Massachusetts. Rented electric power was second in importance in the industry as a whole and in most of the states shown in the table. In Ohio the horsepower of gas engines was large, as was that of water wheels in New York.

Fuel consumed.—Statistics on this subject are shown in Table 22, on page 13.

Bituminous coal was the principal fuel used, 285,545 tons being consumed in 1909. Massachusetts was the largest user of this fuel, consuming 96,144 tons, or 33.7 per cent. In New York, Pennsylvania, and New Jersey more anthracite than bituminous coal was used. Ohio used large quantities of gas, and California the largest quantity of oil.

SPECIAL STATISTICS AS TO PRODUCTS.

The special schedule used in collecting the statistics for the boot and shoe industry at each of the last three censuses required a detailed statement of the number of pairs of the different kinds of boots, shoes, and slippers manufactured, and in 1909 classified according to method of manufacture. Values were not called for in this connection in 1909.

Production, by kinds.—Table 23 shows the number of pairs of the different kinds of footwear made in the United States and in 13 of the leading states in 1909, 1904, and 1899, respectively. In comparing these statistics it should be noted that the special schedule for 1909 for the first time called specifically for the output of infants' shoes and slippers. The number of pairs of such shoes and slippers reported in that year was 15,000,721. This number is not shown as a separate item in Table 23, nor included with any of the classes specified, but it is included in the total output of 285,017,181 pairs of boots, shoes, and slippers. Similarly, the total for each state for 1909 includes the production of infants' shoes and slippers, but they are not included in the other columns. It is probable that at the censuses of 1904 and 1899 some infants' shoes and slippers were reported under the heading "misses' and children's boots and shoes," some under the heading "women's, misses', and children's slippers," and some under the heading "all other kinds," while for some the value only may have been reported. It is impossible to distribute the total number of infants' shoes and slippers reported in 1909 among the three classes just mentioned—and, indeed, they do not properly belong to any of them. For these reasons the statistics for misses' and children's shoes, for women's, misses', and children's slippers, and for "all other kinds," as shown in the table, are not closely comparable for the three censuses.

Of the total of 285,017,181 pairs of footwear reported in 1909, men's boots and shoes numbered 93,888,892 pairs, or 32.9 per cent; women's boots and shoes,

86,595,314 pairs, or 30.4 per cent; boys' and youths' boots and shoes, 23,838,626 pairs, or 8.4 per cent; misses' and children's boots and shoes, 43,320,365 pairs, or 15.2 per cent; slippers of all sorts, 17,507,834 pairs, or 6.1 per cent; infants' shoes and slippers, 15,000,721 pairs, or 5.3 per cent; and "all other kinds," which include outing and sporting boots and shoes, sandals, bath shoes, felt and carpet slippers, etc., numbered 4,865,429 pairs, or 1.7 per cent. Of course, the relative importance of the several kinds, as measured by value, would be quite different.

The total number of pairs of boots, shoes, and slippers of all classes combined made in 1899 was 217,965,419, as compared with 285,017,181 in 1909, the increase during the decade being 67,051,762 pairs, or 30.8 per cent. For men's boots and shoes the increase between 1899 and 1909 was 38.6 per cent, and for women's boots and shoes 33.3 per cent, but for boys' and youths' boots and shoes it was only 13.4 per cent. As already stated, the data for the other classes of products shown in the table are scarcely comparable. But for the exclusion of infants' shoes and slippers at the census of 1909, the classes of misses' and children's boots and shoes and women's, misses', and children's slippers would probably have shown a considerable increase as compared with 1899. The figures for "all other kinds" probably are the least comparable of all. For example, it seems likely that the large production reported under this heading for Pennsylvania in 1904 (3,009,090 pairs) which was many times greater than that reported in 1909, included large numbers of infants' shoes and slippers. The production of infants' shoes and slippers in Pennsylvania in 1909, as reported separately, was 4,563,505 pairs.

Massachusetts led at each census in the production of every class of boots, shoes, and slippers for which figures are shown, although its proportion of the total for most classes was lower in 1909 than in 1899.

Massachusetts reported 48.1 per cent of the men's boots and shoes shown for 1909, 37.9 per cent of the boys' and youths', 42.5 per cent of the women's, and 27.4 per cent of the misses' and children's; the corresponding proportions for 1899 were 59.1 per cent, 50.7 per cent, 37.7 per cent, and 34.7 per cent, respectively. In the manufacture of boys' and youths' boots and shoes this state shows an actual loss during the decade of 1,640,496 pairs, or 15.4 per cent, and in that of misses' and children's boots and shoes it shows a loss, according to the table, of 2,636,592 pairs, or 18.2 per cent—a figure which, however, for reasons already stated, may be misleading. The greatest absolute increase in the produc-

tion of boots and shoes of all classes combined from 1899 to 1909 is shown for Missouri, 16,866,712 pairs, or 216.5 per cent. Missouri also shows the largest absolute gain during the decade in boys' and youths' boots and shoes, 1,661,279 pairs, or 390 per cent. The greatest absolute increase in the manufacture of men's boots and shoes during the decade is shown for New Hampshire, 8,982,499 pairs, or 330.7 per cent. Massachusetts shows the largest absolute increase from 1899 to 1909 in the manufacture of women's shoes, 12,277,665 pairs, or 50.1 per cent; but Missouri, with a gain during this period of 5,522,054 pairs, shows a much greater relative increase, 176.9 per cent.

PRODUCTION OF BOOTS, SHOES, AND SLIPPERS, BY KINDS, FOR LEADING STATES: 1909, 1904, AND 1899.

Table 23

STATE.	Census.	Number of establishments.	Total number of pairs.	BOOTS AND SHOES (NUMBER OF PAIRS).					SLIPPERS (NUMBER OF PAIRS).			All other kinds (number of pairs).
				Total.	Men's.	Boys' and youths'.	Women's.	Misses' and children's.	Total.	Men's, boys' and youths'.	Women's, misses', and children's.	
United States..	1909	1,343	295,017,181	247,643,197	93,888,892	23,838,626	86,595,314	43,320,365	17,607,834	4,802,841	12,704,993	4,885,429
	1904	1,318	242,110,035	216,039,401	83,434,322	21,717,238	69,470,878	41,418,967	17,518,291	4,403,097	13,116,194	8,552,343
	1899	1,599	217,985,419	195,589,173	67,742,839	21,030,479	64,972,873	41,843,202	17,092,841	4,446,965	12,846,878	6,283,405
Massachusetts.....	1909	469	118,009,926	102,826,648	45,155,939	9,019,124	36,778,432	11,873,153	10,155,324	3,369,808	6,785,516	1,417,378
	1904	502	107,259,876	93,546,297	44,878,920	8,439,461	28,190,958	12,036,958	12,069,160	3,549,189	8,519,971	1,644,419
	1899	640	102,732,545	89,680,941	40,004,809	10,665,620	24,500,767	14,509,745	12,052,114	3,282,260	8,769,854	999,490
New York.....	1909	219	28,538,451	20,105,346	3,853,855	745,527	10,141,133	5,364,831	2,518,469	701,356	1,817,113	2,116,961
	1904	188	23,827,290	19,010,064	5,576,787	1,265,183	7,174,649	4,993,445	2,037,412	393,968	1,643,444	1,644,419
	1899	223	19,453,923	16,521,347	3,870,221	1,402,066	5,896,367	5,352,693	1,667,410	435,215	1,232,196	1,265,166
Missouri.....	1909	52	25,931,107	24,657,160	9,303,028	2,087,258	8,642,965	4,823,909	616,229	27,551	588,678	(?)
	1904	34	16,439,858	15,918,052	5,740,729	1,819,192	5,993,114	2,365,017	249,806	26,500	223,306	272,000
	1899	50	8,247,247	7,790,448	3,083,759	425,979	3,120,911	1,159,799	202,799	10,296	192,503	254,000
New Hampshire.....	1909	52	25,534,114	25,069,572	11,698,985	4,176,479	4,587,874	4,606,234	282,124		282,124	
	1904	50	22,110,427	20,790,119	7,835,134	3,614,135	4,759,444	4,581,406	1,270,308	244,020	1,026,288	50,000
	1899	67	21,172,691	20,044,781	2,716,486	3,758,750	9,064,178	4,505,367	1,127,910	466,466	661,444	
Ohio.....	1909	63	18,908,915	17,693,316	1,702,194	1,372,330	11,154,083	3,464,709	1,147,239	180,507	966,732	
	1904	62	18,263,416	18,063,299	1,861,202	1,590,568	9,797,093	5,014,436	1,952,053	25,379	166,674	8,084
	1899	81	13,849,679	13,507,978	527,241	974,257	8,204,972	3,801,508	275,991	36,300	239,691	66,710
Pennsylvania.....	1909	124	17,588,474	11,631,329	942,959	1,105,348	3,285,815	6,297,207	1,165,117	127,944	1,037,173	228,523
	1904	119	13,336,420	9,998,589	1,116,021	1,035,721	3,417,319	4,429,528	328,741	6,778	321,963	3,009,090
	1899	146	12,478,056	10,978,367	1,632,913	449,297	3,506,682	5,389,475	275,666	13,720	261,946	1,224,023
Maine.....	1909	47	9,275,102	9,066,454	4,786,134	665,270	2,886,923	728,127	(?)	(?)	(?)	(?)
	1904	50	9,261,587	9,152,833	5,709,462	1,048,268	2,244,921	150,182	29,934	9,710	20,224	78,820
	1899	48	10,748,890	10,114,090	6,134,268	1,421,682	2,208,873	349,267	471,876	6,144	465,732	162,924
Illinois.....	1909	46	8,295,805	8,893,731	4,018,016	1,270,520	1,034,470	570,725	274,697	112,900	161,797	125,100
	1904	44	6,143,462	5,736,197	3,463,185	691,165	887,707	694,140	261,265	43,099	218,166	146,000
	1899	54	6,061,982	5,669,476	2,975,957	419,839	1,552,473	721,207	213,126	45,420	167,706	179,380
Wisconsin.....	1909	59	7,296,629	6,777,363	4,055,496	652,109	1,442,341	627,417	204,872	39,018	165,854	169,075
	1904	63	4,408,468	3,951,542	2,064,125	548,867	737,567	600,983	269,942	41,288	228,654	186,984
	1899	40	3,632,227	3,230,682	1,428,720	330,007	1,226,134	245,821	202,597	17,732	184,865	98,948
New Jersey.....	1909	40	6,154,954	4,943,451	602,075	137,612	755,486	3,448,278		(?)	538,295	(?)
	1904	51	6,274,064	5,816,608	543,657	87,104	672,309	4,513,538	428,036	33,278	394,760	29,420
	1899	84	6,877,084	6,859,157	699,325	156,977	845,575	4,257,280	221,287	37,740	183,547	796,640
Virginia.....	1909	8	4,255,236	4,169,835	815,476	361,946	2,370,961	621,552				
	1904	6	2,710,938	2,616,438	89,450	216,116	2,013,468	297,404	94,500		94,500	
	1899	5	1,896,444	1,792,061	40,928	2,930	1,450,989	297,214	19,400		19,400	84,983
Minnesota.....	1909	18	3,195,530	3,184,450	2,025,723	115,529	766,301	276,897				
	1904	17	2,639,560	2,373,222	1,162,677	387,408	419,591	403,546	42,000		42,000	224,338
	1899	16	2,456,882	2,328,411	1,336,793	339,375	423,276	228,967	69,063	10,614	59,049	59,408
Michigan.....	1909	23	2,986,002	2,249,779	794,217	634,192	684,602	236,768	107,912	20,600	87,312	290,311
	1904	23	2,012,582	1,909,440	786,602	176,727	716,263	229,848	88,518	10,910	77,608	14,624
	1899	13	1,111,748	1,048,269	325,991	107,337	542,993	71,948	45,232	30,232	15,000	18,247
All other states.....	1909	122	9,046,936	8,374,763	4,134,795	1,595,482	2,063,928	580,558	1,035,851	223,157	274,399	518,081
	1904	117	7,422,087	7,156,701	2,806,371	797,321	2,446,473	1,106,536	156,616	18,980	137,636	108,770
	1899	132	7,346,021	7,023,165	3,065,428	576,363	2,428,463	952,911	248,370	55,426	192,944	74,486

¹ Includes 15,000,721 pairs of infants' shoes and slippers not included in any of the classes specified in the table. See text above as to comparability of the statistics.

² Included under "all other states," to avoid disclosure of individual operations.

Massachusetts reported 58 per cent of the total number of pairs of slippers manufactured in 1909 and 70.5 per cent in 1899. The output, as shown in the table, fell off by 1,896,790 pairs, or 15.7 per cent, but

this may be due to the exclusion of infants' slippers from the statistics for 1909. In the case of men's, boys', and youths' slippers, for which the statistics are fairly comparable, Massachusetts reported 70.2 per cent of

the total number of pairs for the United States in 1909 and 73.8 per cent in 1899, the output of the state, however, increasing slightly during the decade.

Large relative increases from 1899 to 1909 are shown for some of the states of less importance in the industry, among which may be mentioned that of Virginia, in men's boots and shoes, from 40,928 to 815,476 pairs, and in boys' and youths' boots and shoes, from 2,930 to 361,846 pairs; that of Minnesota, in men's boots and shoes, from 1,336,793 to 2,025,723 pairs; and that of Wisconsin, in men's boots and shoes, from 1,428,720 to 4,055,496 pairs.

As already indicated, some of the extraordinary changes shown in the production of women's, misses', and children's slippers in certain states are probably misleading, being due to the failure to distribute properly some of the products reported for 1904 and 1899 and to the exclusion of infants' shoes and slippers from the figures for 1909.

Table 24 shows the total number of pairs of infants' shoes and slippers manufactured in 1909, figures for seven important states being also presented.

STATE.	Infants' shoes and slippers (pairs).
United States.....	15,000,721
Illinois.....	1,002,277
Massachusetts.....	3,610,576
Michigan.....	338,000
Missouri.....	657,368
New Hampshire.....	182,418
New York.....	3,797,675
Pennsylvania.....	4,563,505
All other states.....	848,902

Pennsylvania, New York, and Massachusetts, in the order named, were the most important states in the production of infants' shoes and slippers, and reported a combined output of 11,971,756 pairs, or 79.8 per cent of the total production in 1909.

Production, by methods of manufacture.—The production of boots, shoes, and slippers according to method of manufacture was first reported in 1909. The following table gives in detail, for the United States as a whole, the number of pairs of boots, shoes, and slippers produced by each method of manufacture used.

KIND.	NUMBER OF PAIRS: 1909					
	Total.	Machine or hand welt.	Turned.	McKay.	Wooden-pegged.	Wire-screw or metal-fastened.
Boots and shoes.....	247,643,197	87,391,763	26,317,990	107,063,644	5,226,161	21,643,639
Men's.....	98,888,892	53,212,450	989,240	20,438,585	3,921,652	15,326,965
Boys' and youths'.....	23,838,626	4,423,934	50,377	15,016,611	567,939	3,779,765
Women's.....	86,595,314	25,871,909	14,281,764	44,518,966	533,579	1,389,106
Misses' and children's.....	43,320,365	3,883,480	10,996,609	27,089,482	202,991	1,147,802
Slippers.....	17,507,834	1,318,995	7,611,748	8,396,874	28,918	151,299
Men's, boys' and youths'.....	4,802,841	648,007	1,733,742	2,286,652	16,851	117,589
Women's, misses', and children's.....	12,704,993	670,988	5,878,006	6,110,222	12,067	33,710
Infants' shoes and slippers.....	15,000,721	1,979,593	11,447,508	1,520,072	41,731	11,817
All other.....	4,865,429	1,429,249	1,189,742	1,286,281	321,082	639,075

The McKay method of manufacture led in 1909, with 41.5 per cent of the total production; the machine or hand welt method was second, with 32.3 per cent; and the turned product ranked third, with 16.3 per cent, followed by the wire-screw or metal-fastened with 7.9 per cent, and the wooden-pegged with 2 per cent.

The McKay method also predominated for three of

the four classes of boots and shoes and for the two classes of slippers for which separate figures are presented. Infants' shoes and slippers were chiefly turned, while for "all other kinds" the machine or hand welt method shows the largest number.

Table 26 shows the proportions of the different classes of boots, shoes, and slippers produced by the several methods of manufacture in 1909.

METHOD.	BOOTS AND SHOES.				SLIPPERS.		Infants' shoes and slippers.	All other.
	Men's.	Boys' and youths'.	Women's.	Misses' and children's.	Men's, boys', and youths'.	Women's, misses', and children's.		
Per cent of total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Machine or hand welt.....	56.7	18.6	29.9	9.0	13.5	5.3	13.2	29.4
Turned.....	1.1	0.2	16.5	25.4	36.1	46.3	76.3	24.5
McKay.....	21.8	63.0	51.4	62.5	47.6	48.1	10.1	28.4
Wooden pegged.....	4.2	2.4	0.6	0.5	0.4	0.1	0.3	6.6
Wire screw or metal fastened.....	16.3	15.9	1.6	2.6	2.4	0.3	0.1	13.1

Table 27 shows the total number of pairs of boots, shoes, and slippers of all kinds combined, produced by each method of manufacture, in the 13 leading states in 1909.

STATE.	NUMBER OF PAIRS OF BOOTS, SHOES, AND SLIPPERS MANUFACTURED: 1909					
	Total.	Machine or hand welt.	Turned.	McKay.	Wooden pegged.	Wirescrew or metal fastened.
United States.....	285,017,181	92,119,600	46,586,988	118,266,871	5,617,892	22,445,830
Massachusetts.....	118,009,926	43,068,216	18,104,556	43,910,241	4,129,280	8,797,633
New York.....	28,538,451	8,841,244	9,817,985	7,682,691	(1)	(1)
Missouri.....	25,931,107	7,427,519	1,499,685	15,132,538	153,778	1,717,587
New Hampshire.....	25,534,114	6,342,752	1,042,833	15,947,025	(2)	2,201,504
Ohio.....	18,908,915	5,828,114	1,746,079	10,286,810	(2)	1,047,912
Pennsylvania.....	17,588,474	3,436,095	8,615,131	4,900,313	187,166	449,769
Maine.....	9,275,102	4,746,113	535,489	3,686,416	(2)	307,084
Illinois.....	8,295,805	3,820,728	(1)	3,458,585	(1)	430,489
Wisconsin.....	7,296,629	1,825,953	565,617	2,123,436	151,406	2,630,217
New Jersey.....	6,154,954	1,480,016	2,972,614	1,702,324	.....	(3)
Virginia.....	4,255,236	615,949	(1)	3,371,809	(1)	(1)
Minnesota.....	3,195,530	1,618,890	171,385	875,652	29,830	508,773
Michigan.....	2,980,002	1,121,617	625,961	510,074	(2)	728,350

¹ Figures can not be shown without disclosing individual operations.
² Included in "wirescrew or metal fastened," to avoid disclosure of individual operations.
³ Included in "McKay," to avoid disclosure of individual operations.

The machine or hand welt method was the method most largely used in Maine, Illinois, Minnesota, and Michigan; the McKay method was the most important in Massachusetts, Missouri, New Hampshire, Ohio, and Virginia; turned work ranked first in New York, Pennsylvania, and New Jersey; and in Wisconsin the wire-screw or metal-fastened product was the most important.

GENERAL STATISTICS, BY STATES.

The principal data secured by the census inquiry concerning the manufacture of boots and shoes, cut stock, and findings combined are presented in two general tables.

Table 28 gives detailed statistics for the industry, by states, for 1909, showing the number of establishments, number of persons engaged in the industry, primary horsepower, capital invested, expenses (so far as these were reported), value of products, and value added by manufacture.

Table 29 shows somewhat less detailed statistics for 1909, 1904, and 1899, by states.

Table 28		PERSONS ENGAGED IN INDUSTRY.									WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Pri- mary horse- power.	
STATE.	Number of estab- lish- ments.	Total.	Pro- pri- etors and firm mem- bers.	Sala- ried officers, super- intend- ents, and man- agers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.			
					Male.	Fe- male.	Average num- ber.	Number, 15th day of—			Male.	Fe- male.	Male.	Fe- male.		
								Maximum month.	Minimum month.							
1	United States	1,918	215,823	1,838	3,914	6,867	5,007	193,297	De 207,452	My 190,382	211,507	132,411	70,457	5,010	3,629	96,302
2	California.....	18	840	76	18	37	14	695	No 754	Jy 542	791	547	199	38	7	369
3	Connecticut.....	10	582	15	20	17	10	520	Mh ¹ 536	Au 493	568	256	304	6	2	235
4	Illinois.....	53	6,392	38	113	311	138	5,792	Fe 5,981	Je 5,572	5,917	3,823	1,953	177	164	2,770
5	Indiana.....	8	524	4	22	49	13	436	No 505	Mh 380	496	344	128	13	11	393
6	Iowa.....	10	770	2	20	26	6	718	Jy 776	Se 658	725	383	317	19	6	345
7	Kentucky.....	13	570	11	41	81	11	426	Oc 468	Au 412	472	263	189	9	11	232
8	Louisiana.....	13	319	21	6	8	6	278	Oc 305	Ja 188	291	220	61	5	5	190
9	Maine.....	55	7,195	29	148	234	158	6,626	Fe 7,274	Jy 6,190	7,170	4,682	2,366	92	30	3,810
10	Maryland.....	14	670	11	25	32	8	594	Ap ¹ 613	Je 555	599	353	190	38	18	252
11	Massachusetts.....	860	90,048	911	1,459	2,120	2,495	83,063	De 87,797	My 73,536	89,751	57,494	28,922	1,959	1,376	35,051
12	Michigan.....	23	2,703	9	49	127	63	2,455	De 2,547	My 2,395	2,547	1,490	893	99	65	786
13	Minnesota.....	18	2,349	4	48	188	45	2,664	De 2,854	My 2,437	2,862	1,826	1,021	6	9	1,411
14	Missouri.....	59	18,665	14	220	776	259	17,396	De 18,223	My 16,820	18,241	11,048	5,801	853	539	11,113
15	New Hampshire.....	68	15,113	61	251	271	319	14,211	No 15,200	My 13,744	15,369	10,195	4,807	220	147	8,582
16	New Jersey.....	53	4,602	46	111	153	60	4,232	De 4,366	Ap 4,126	4,369	2,656	1,587	68	58	1,500
17	New York.....	296	23,815	293	502	759	634	21,627	De 22,755	Ja 20,655	22,857	14,548	7,847	255	207	10,456
18	North Carolina.....	7	211	6	6	17	4	178	No ¹ 209	Ap 137	209	146	38	20	5	242
19	Ohio.....	72	17,607	40	393	751	397	16,026	De 17,033	Ap 13,880	17,122	9,510	7,023	254	335	8,925
20	Oregon.....	5	67	2	3	4	2	56	Jy ¹ 59	Ja 53	59	54	4	1	.....	39
21	Pennsylvania.....	140	11,829	167	232	435	173	10,822	De 11,033	Ap 10,669	11,281	6,598	3,877	451	355	4,337
22	Rhode Island.....	6	81	6	2	8	2	65	De 79	Ja 53	79	47	32	.....	.....	106
23	Tennessee.....	4	427	7	9	35	2	374	Jy 385	Fe 358	383	252	86	34	11	174
24	Texas.....	6	52	10	3	2	1	36	No ¹ 40	Fe ¹ 34	40	35	2	3	.....	24
25	Virginia.....	10	2,973	6	68	126	62	2,711	Je 2,768	Fe 2,648	2,694	1,984	586	72	52	1,410
26	Washington.....	12	205	11	7	9	6	172	No 199	Je 156	207	160	47	.....	.....	151
27	Wisconsin.....	68	5,962	28	120	274	111	5,431	De 5,694	Jy 5,173	5,695	3,284	1,921	287	203	2,923
28	All other states ²	17	752	12	18	19	8	695	.....	.....	713	413	256	31	13	478

¹ Same number reported for one or more other months.

FINDINGS—DETAILED STATISTICS, BY STATES: 1909.

	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1	\$222,324,248	\$477,843,146	\$7,981,646	\$10,647,775	\$86,462,695	\$1,847,885	\$330,890,328	\$2,096,434	\$320,561	\$1,961,659	\$23,134,163	\$512,797,642	\$180,059,429
2	1,192,217	1,718,523	42,450	46,891	402,488	12,422	1,107,402	18,000	3,788	-----	85,082	1,924,278	804,454
3	746,199	1,466,375	26,740	29,427	225,924	5,418	1,082,829	5,532	2,066	12,116	76,323	1,657,578	569,331
4	7,569,620	15,485,947	298,955	400,916	3,142,912	106,865	10,761,977	81,340	23,920	4,170	664,892	16,754,704	5,885,862
5	738,228	974,658	29,075	52,540	158,997	12,046	652,297	2,178	4,068	45	63,412	977,934	313,591
6	790,293	1,509,946	26,366	27,419	318,158	9,419	1,049,694	3,515	1,404	-----	73,971	1,632,911	573,798
7	1,700,306	3,226,157	69,549	141,022	170,740	4,230	2,440,107	2,946	4,691	253,408	139,464	3,247,825	803,488
8	366,342	465,123	9,850	12,940	112,234	6,064	296,951	4,980	926	-----	21,178	616,789	213,774
9	7,284,376	14,706,825	257,262	435,680	3,210,048	68,363	9,872,142	11,748	13,925	4,737	828,020	15,508,771	5,568,266
10	677,706	1,362,474	32,368	32,116	239,242	8,093	904,079	12,835	3,381	48,618	81,742	1,431,017	518,845
11	90,242,915	218,269,055	2,956,365	3,692,281	45,990,138	652,487	152,337,465	989,920	365,254	1,225,419	10,059,726	236,342,915	83,352,963
12	2,885,564	4,951,650	79,551	166,858	935,935	27,236	3,320,075	27,249	16,439	10,402	367,905	5,255,966	1,908,655
13	5,729,038	7,260,058	120,233	286,077	1,290,216	40,687	4,893,910	66,905	23,541	47,858	490,631	7,567,582	2,632,985
14	15,837,749	46,532,538	507,220	928,287	8,163,815	155,519	34,364,182	102,235	87,341	183,260	2,020,679	48,751,235	14,211,534
15	12,700,431	37,408,502	449,402	400,295	6,897,133	119,815	28,095,325	56,936	26,206	12,900	1,350,490	39,439,544	11,224,404
16	4,107,664	7,502,291	213,784	234,482	1,923,198	28,548	4,698,577	18,652	10,763	27,947	346,340	8,041,623	3,314,498
17	26,047,823	44,889,191	1,011,762	1,241,984	10,668,548	256,305	28,718,206	365,482	48,643	72,075	2,506,186	48,185,914	19,211,403
18	413,492	340,125	5,942	11,177	46,455	1,641	239,940	372	2,386	-----	32,212	408,079	166,498
19	16,755,293	29,516,430	746,715	1,377,843	6,645,790	126,956	18,745,051	162,529	93,839	128	1,617,579	31,550,957	12,678,950
20	63,177	149,656	4,200	4,860	39,548	947	94,056	2,115	232	-----	3,698	155,507	60,504
21	11,660,633	18,432,282	619,589	541,891	4,266,300	77,151	11,986,631	79,581	14,419	5,955	840,765	20,218,784	8,155,002
22	121,274	103,621	4,080	3,996	27,682	1,947	55,022	4,330	902	-----	5,662	142,080	85,111
23	532,067	1,120,964	23,800	46,117	117,896	6,761	820,736	2,763	1,814	30,316	70,761	1,180,894	353,397
24	56,247	83,060	5,400	2,344	17,781	737	47,586	1,380	328	-----	7,504	102,133	53,810
25	3,999,099	5,610,340	141,577	110,624	804,921	20,615	3,998,889	14,836	27,295	565	491,018	5,806,503	1,788,999
26	976,635	596,071	14,700	6,580	89,457	5,197	452,195	6,917	2,063	-----	18,962	611,131	153,739
27	8,232,993	12,501,006	246,823	391,401	2,243,464	79,621	8,673,215	45,719	30,652	-----	790,111	13,602,234	4,849,398
28	891,869	1,660,278	37,888	21,827	313,675	12,795	1,161,789	6,439	5,275	21,740	78,850	1,780,754	606,170

* All other states embrace: Colorado, 1 establishment; Delaware, 1; Georgia, 3; Nebraska, 3; Oklahoma, 1; Utah, 2; Vermont, 4; West Virginia, 2.

BOOTS AND SHOES, INCLUDING CUT STOCK AND FINDINGS—COMPARATIVE STATISTICS, BY STATES:
 1909, 1904, AND 1899.

Table 29	STATE.	Census.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).	
			Total.	Proprietors and firm members.	Salariated employees.	Wage earners (average number).								
Expressed in thousands.														
	United States.....	1909 1904 1899	1,918 1,895 2,253	215,923 171,940	1,838 2,128	15,788 8,518 8,348	198,297 160,294 151,231	96,302 63,868 55,489	\$222,324 136,802 110,383	\$18,629 8,412 8,159	\$98,463 73,072 61,824	\$332,738 225,288 181,456	\$512,798 357,688 290,047	\$180,060 132,400 98,691
	California.....	1909 1904 1899	18 24 1 ³⁴	840 817 1,151	76 59 88	69 50 63	695 708 1,000	369 246	1,192 1,157 1,262	89 51 56	402 389 460	1,120 1,000 1,103	1,924 1,734 1,862	804 734 759
	Connecticut.....	1909 1904 1899	10 12 15	582 559 737	15 13 28	47 47 40	520 499 719	235 253 379	746 589 790	56 54 38	226 209 298	1,088 820 987	1,658 1,319 1,517	570 499 530
	Illinois.....	1909 1904 1899	53 52 2 ⁶³	6,392 4,587	38 41	562 297 304	5,792 4,249 4,790	2,770 1,977	7,570 3,945 3,558	700 336 347	3,143 1,991 2,085	10,869 6,415 7,160	16,755 9,993 10,499	5,888 3,578 3,339
	Indiana.....	1909 1904 1899	8 14 10	594 250	4 1	84 23 48	436 226 639	393 133	738 306 563	82 20 46	159 71 164	664 300 678	978 460 937	314 160 259
	Iowa.....	1909 1904 1899	10 15 7	770 499 613	2 1 7	52 20 40	716 478 566	345 263 233	790 419 507	54 18 36	318 186 192	1,059 522 507	1,633 854 786	574 332 279
	Kentucky.....	1909 1904 1899	13 9 1 ¹¹	570 720 303	11 8 19	133 53 63	426 659 221	232 268 122	1,700 756 261	211 47 37	171 200 57	2,444 1,360 470	3,248 1,930 657	804 570 187
	Louisiana.....	1909 1904 1899	13 10 2 ¹²	319 422 444	21 25 20	20 37 27	278 370 397	190 169 146	366 352 289	23 31 26	112 137 145	303 378 442	517 620 661	214 242 219
	Maine.....	1909 1904 1899	55 58 2 ⁵³	7,195 6,363 6,876	29 42 46	540 371 362	6,626 5,950 6,408	3,810 3,010	7,284 4,643 5,186	893 382 353	3,210 2,673 2,070	9,941 8,435 8,445	15,509 12,608 12,431	5,568 4,173 3,986
	Maryland.....	1909 1904 1899	14 20 29	670 756	11 20	65 681 51	594 681 920	252 182	678 445 551	64 44 54	239 247 299	912 546 769	1,431 1,040 1,261	519 494 492
	Massachusetts.....	1909 1904 1899	860 893 1,056	90,048 75,156 69,580	911 1,110 1,423	6,074 3,898 2,922	83,063 70,148 65,235	35,051 24,536	90,243 59,925 45,546	6,649 3,737 2,815	45,990 36,175 30,302	152,990 110,610 94,049	236,343 173,680 141,239	83,353 68,070 47,190
	Michigan.....	1909 1904 1899	23 23 1 ¹³	2,703 1,918 1,213	9 7 19	239 178 77	2,455 1,723 1,117	786 649	2,886 1,702 1,136	246 190 70	936 681 386	3,347 2,016 1,164	5,256 3,531 1,915	1,909 1,515 751
	Minnesota.....	1909 1904 1899	18 17 1 ¹⁶	2,949 1,937 2,184	4 8 13	281 215 146	2,664 1,714 2,025	1,411 883 808	5,729 2,432 2,238	406 188 155	1,290 719	4,935 2,632 2,378	7,568 4,170 3,616	2,633 1,538 1,238
	Missouri.....	1909 1904 1899	59 37 57	18,665 10,949	14 8	1,255 490 336	17,396 10,451 5,970	11,113 5,145	15,838 8,290 4,218	1,436 568 356	8,164 4,349 2,070	34,540 14,953 11,456	48,751 23,541 11,456	14,211 8,588 3,333
	New Hampshire.....	1909 1904 1899	68 61 84	15,113 11,329 12,894	61 74 106	841 511 372	14,211 10,744 12,416	8,582 5,284	12,700 8,274 8,330	850 464 366	6,897 4,494 5,106	28,215 15,747 16,713	39,440 22,834 23,766	11,225 7,087 7,053
	New Jersey.....	1909 1904 1899	53 65 105	4,602 4,838 5,089	46 61 108	324 253 350	4,232 4,524 4,631	1,500 1,598	4,108 3,318 3,359	448 292 386	1,923 1,865 1,806	4,727 4,197 4,457	8,042 7,588 7,519	3,315 3,391 3,062
	New York.....	1909 1904 1899	296 259 320	23,815 18,776 18,167	293 292 376	1,895 1,066 1,136	21,627 17,418 16,655	10,456 6,571	26,048 15,571 12,959	2,254 1,032 1,067	10,669 7,873 6,431	28,975 22,400 17,309	48,186 37,521 28,117	19,211 15,121 10,808
	North Carolina.....	1909 1904 1899	7 7 3	211 109 44	6 11 1	27 9 3	178 89 40	242 70 53	413 86 38	17 6 2	46 25 14	242 117 53	408 186 73	166 69 20
	Ohio.....	1909 1904 1899	72 73 92	17,607 15,091 13,758	40 55 97	1,541 1,004 895	16,026 14,032 12,766	8,925 6,113	16,755 10,434 7,654	2,125 1,010 966	6,646 5,275 4,010	18,872 14,989 11,310	31,551 25,735 18,246	12,679 10,746 6,936
	Oregon.....	1909 1904 1899	5 3 3	67 25	2	9	56 25 11	39 15	68 34 26	9 17 2	40 26 6	95 26 29	156 55 44	61 29 15
	Pennsylvania.....	1909 1904 1899	140 133 169	11,829 9,685 10,162	167 195 241	840 500 674	10,822 8,990 9,247	4,337 3,221	11,661 7,394 7,051	1,161 485 588	4,266 3,263 3,148	12,064 8,907 8,682	20,219 14,884 13,830	8,155 5,977 5,148
	Rhode Island.....	1909 1904 1899	6 15 2 ⁸	81 117 92	6 4 6	10 4 22	65 109 64	106 88	121 155 203	8 5 18	28 45 33	57 61 217	142 175 335	85 114 118
	Tennessee.....	1909 1904	4 4	427 246	7 5	46 16	374 225	174 200	532 174	70 19	118 78	827 640	1,181 837	354 197
	Texas.....	1909 1904	6 15	52 50	10 7	6 43	36 43	24 15	56 56	8	18 22	48 39	102 91	54 52
	Virginia.....	1909 1904 1899	10 6 5	2,973 1,801 1,203	6 6 5	256 63 45	2,711 1,738 1,153	1,410 515	3,999 975 641	252 81 51	805 369 206	4,020 1,915 1,160	5,809 2,627 1,452	1,789 712 292
	Washington.....	1909 1904 1899	12 15 3	205 124	11 6	22 12 15	172 106 75	151 31	977 183 71	21 11 12	89 47 31	457 121 103	611 226 166	154 105 63
	Wisconsin.....	1909 1904 1899	68 62 44	5,962 3,799	26 34	505 271	5,431 3,494	2,923 1,686	8,233 3,916	638 273	2,243 1,326	8,753 4,417	13,602 6,844	4,840 2,427
	All other states.....	1909 1904 1899	17 41 43	752 1,017	12 41	45 75 114	695 901 1,164	476 847	893 1,271 1,259	59 68 89	315 346 382	1,174 1,725 2,473	1,778 2,605 880	604 774

¹ Excluding statistics for one establishment, to avoid disclosure of individual operations.

² Excluding statistics for two establishments, to avoid disclosure of individual operations.

LEATHER, TANNED, CURRIED,
AND FINISHED

THE LEATHER INDUSTRY.

GENERAL STATISTICS.

Nature of the industry.—The industry designated by the Bureau of the Census "leather, tanned, curried, and finished," which for brevity may be called simply the leather industry, includes establishments engaged primarily in the manufacture of leather from various kinds of hides and skins. A great variety of different kinds of leather are produced, and for some kinds the processes are quite different from those for others. The processes may, for the most part, be classified into the two main groups of tanning, on the one hand, and currying and finishing on the other. The process of tanning is applied in producing all kinds of leather. Most kinds of leather are subjected to finishing processes to render them more pliable, to give them the desired kind of surface, or to color them. The hides of cattle are frequently split to make the leather thinner and more pliable and to increase the area obtained.

In many establishments leather is both tanned and finished, but in some cases the different processes are performed at different establishments. One establishment may buy rough tanned leather from another establishment and curry or finish it. To this extent there is a duplication in the cost of materials and in the value of products shown for the industry as a whole, as the cost of materials and the value of products for each establishment are included in the respective totals. In other cases one establishment may tan hides and skins, or may curry or finish leather, owned by another establishment in the leather industry, the work being performed under contract. Under these conditions the value of products reported by the establishment performing the work is only the compensation received therefor, and not the value of the leather as turned out, which is reported by the establishment for which the work is done. There is,

of course, some duplication in value of products under these conditions, but the full value of the products is not duplicated.

Finally, there are a good many establishments which tan or curry and finish leather under contract for concerns other than those engaged in the leather industry, particularly for dealers in leather. In such cases also the value of products reported for the establishment performing the work represents only the compensation for work performed, and consequently the total value of products shown for the leather industry does not include the entire value of leather so produced. Separate statistics are given in this report, however, with respect to the number and estimated value of hides and skins treated under contract for others than tanners, curriers, and finishers.

Some of the establishments assigned to industries other than "leather, tanned, curried, and finished," tan or curry and finish leather which they use for manufacture into more highly finished products. This is particularly the case with respect to establishments making belting, boot and shoe cut stock and findings, leather gloves and mittens, and saddlery and harness. The quantity and value of the leather produced in such establishments are not included with the data shown for the leather industry, but are shown separately in the present report.

Comparison with earlier censuses.—Table 1 summarizes the statistics of the leather industry of the entire country for each census from 1869 to 1909, inclusive.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	919	1,049	1,306	1,787	5,628	7,569	-29.6	-12.4	-19.7	-26.9	(²)	(²)
Persons engaged in the industry..	67,100	61,602	56,024	(³)	(³)	(³)	19.8	8.9	10.0	.....	.....	.....
Proprietors and firm members.....	784	1,112	1,473	(³)	(³)	(³)	-46.8	-29.5	-24.5	.....	.....	.....
Salaried employees.....	4,114	3,251	2,442	(³)	(³)	(³)	68.5	26.5	33.1	.....	.....	.....
Wage earners (average number)	62,202	57,239	52,109	42,392	40,282	35,243	19.4	8.7	9.8	22.9	(⁴)	(⁴)
Primary horsepower.....	148,140	117,450	88,860	60,031	(³)	39,583	66.7	26.1	32.2	48.0	.....	.....
Capital.....	\$332,726,952	\$242,584,254	\$173,977,421	\$98,088,698	\$73,353,911	\$61,124,812	91.2	37.2	39.4	77.4	33.7	20.1
Expenses.....	305,699,411	235,178,632	187,773,353	152,330,272	(³)	(³)	62.8	30.0	25.2	23.3	.....	.....
Services.....	38,846,481	31,501,058	25,749,933	23,985,879	16,503,828	14,505,775	50.9	23.3	22.3	7.4	45.3	13.8
Salaries.....	6,743,636	4,451,906	3,158,842	(³)	(³)	(³)	113.5	51.5	40.9	.....	.....	.....
Wages.....	32,102,845	27,049,152	22,591,091	(³)	(³)	(³)	42.1	18.7	19.7	.....	.....	.....
Materials.....	248,278,933	191,179,073	155,000,004	122,946,721	156,384,117	118,569,634	60.2	29.9	23.3	26.1	(²)	(²)
Miscellaneous.....	18,573,997	12,498,501	7,023,416	5,397,672	(³)	(³)	164.5	48.6	78.0	30.1	.....	.....
Value of products.....	327,874,187	252,620,986	204,038,127	172,136,092	200,264,944	157,237,597	60.7	29.8	23.8	18.5	(²)	(²)
Value added by manufacture (value of products less cost of materials).....	79,595,254	61,441,913	49,038,123	49,189,371	43,880,827	38,667,963	62.3	29.5	25.3	-0.3	(²)	(²)

¹ A minus sign (-) denotes decrease. Where the percentages are omitted comparable figures can not be given.
² Figures not comparable for reasons stated in the text.

³ Comparable figures not available.
⁴ Figures not strictly comparable.

In 1909 there were 919 establishments reported as engaged primarily in the tanning, currying, or finishing of leather. They gave employment to the average to 67,100 persons, of whom 62,202 were wage earners. The amount paid in salaries and wages was \$38,846,481. The value of products for the year was \$327,874,187. The processes of tanning, currying, and finishing are comparatively simple, and the cost of materials represents the greater part of the value of products. The cost of materials in 1909 was \$248,278,933, which is equal to 75.7 per cent of the total value of products. The value added to materials by manufacture was thus \$79,595,254.

Statistics for this industry were first reported at the census of 1849, when there were 6,686 establishments, with 25,595 wage earners and with products for the year valued at \$43,457,898. At the census of 1859 there were reported 5,188 establishments, with 26,246 wage earners and with products valued at \$75,698,747.

The large number of establishments reported for these two early censuses, and also for 1869 and 1879, is in part due to the fact that at the censuses prior to 1889 establishments engaged both in tanning and in currying and finishing made separate reports for each branch of the industry, and thus were counted twice.

In 1879, 3,105 establishments were reported as engaged in the tanning of leather and 2,523 as engaged in currying leather, in dressing skins, and in the manufacture of patent and enameled leather. In 1869, of the 7,569 establishments, 4,237 were

reported as tanneries and 3,332 as engaged in the currying and finishing of leather. Because of this method of handling the statistics from 1849 to 1879 the combined value of products for the two branches of the industry includes much duplication, and the figures are not comparable with those for later censuses. The same is true of the data given for cost of materials.

Substantial increases in value of products were reported at each census from 1889 to 1909. The value of products for 1909 was nearly double the value for 1889, but a part of the increase was due to the advance in prices of materials and products between 1899 and 1909. From 1899 to 1909 the average number of wage earners increased 10,093, or 19.4 per cent, and the value of products \$123,836,060, or 60.7 per cent, while most classes of leather, as appears from later tables, showed greater increases in value than in quantity.

Summary, by states.—Table 2 summarizes the more important statistics for the industry by states, the states being arranged according to the value of products reported for 1909. Percentages of increase for the decade 1899–1909 and for the two five-year periods composing it are also presented. The states are given their actual ranking in this table, consideration being given to the rank of those states for which figures can not be shown. In considering the rank in value of products, it should be borne in mind that there may be more duplication in value in some states than in others.

Table 2

LEATHER, TANNED, CURRIED, AND FINISHED.

STATE.	Number of establishments: 1909	Wage earners.			Value of products.			Value added by manufacture.			Per cent of increase. ¹											
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.		
				1909	1904			1909	1904			1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
				1909	1904			1909	1904			1909	1904	1909	1904	1909	1904	1909	1904	1909	1904	1909
United States...	919	62,202	100.0	.....	.....	\$327,874,187	100.0	.....	.....	\$79,595,254	100.0	.....	.....	19.4	8.7	9.8	60.7	29.8	23.8	82.3	29.5	25.3
Pennsylvania.....	163	14,008	22.5	1 1	1	77,926,321	23.8	1 1	1	18,813,197	23.6	1 1	1	4.6	-2.8	7.6	40.1	12.2	24.8	42.4	34.2	8.1
Wisconsin.....	32	7,548	12.1	3 3	3	44,687,676	13.6	2 3	3	9,839,091	12.4	3 4	4	43.4	35.9	5.6	122.5	72.8	28.7	143.9	64.7	48.1
Massachusetts.....	132	10,252	16.5	2 2	2	40,002,079	12.2	3 2	2	11,236,571	14.1	2 2	2	46.2	13.0	29.4	63.5	19.9	27.9	79.1	9.0	64.4
New Jersey.....	86	5,560	8.9	5 5	5	28,430,955	8.7	4 5	5	8,232,485	10.3	4 3	3	33.1	12.3	18.5	106.8	32.3	58.4	95.4	32.3	47.7
New York.....	109	5,688	9.1	4 4	4	27,642,383	8.4	5 4	4	6,701,650	8.4	5 5	5	-12.9	4.5	-16.6	19.1	27.7	-6.7	15.9	24.8	-7.2
Michigan.....	24	2,291	3.7	8 8	8	15,331,104	4.7	6 8	8	3,210,133	4.0	7 9	9	60.5	31.1	22.4	154.8	64.1	55.3	143.4	55.1	58.9
Illinois.....	29	3,001	4.8	7 7	7	14,911,782	4.5	7 6	6	2,781,173	3.5	8 6	6	32.6	8.3	22.4	90.0	38.6	37.1	34.7	7.6	25.2
West Virginia.....	20	1,571	2.5	11 12	12	12,450,592	3.8	8 11	11	2,067,391	2.8	11 11	11	136.6	86.1	42.5	287.8	105.4	88.8	208.7	59.9	93.0
Delaware.....	16	3,045	4.9	6 6	6	12,079,225	3.7	9 7	7	3,932,375	4.9	6 7	7	23.9	7.4	15.4	28.5	17.8	9.0	65.7	68.0	-1.4
Ohio.....	36	1,884	3.0	9 9	9	10,127,836	3.1	10 10	10	2,408,232	3.0	9 10	10	36.1	17.0	18.3	95.4	55.5	25.7	71.0	17.4	45.7
California.....	40	1,398	2.2	12 10	10	9,366,545	2.9	11 9	9	2,327,092	2.9	10 8	8	-3.9	-7.7	4.2	26.5	16.0	9.0	45.8	7.8	35.3
Virginia.....	39	1,590	2.6	10 11	11	8,266,850	2.5	12 12	12	1,821,689	2.3	12 13	13	78.9	50.7	18.7	75.3	41.8	23.8	78.5	64.0	8.8
North Carolina.....	39	832	1.3	13 15	15	5,415,495	1.7	13 15	15	1,259,344	1.6	13 15	15	127.3	55.8	45.9	260.5	103.4	77.2	237.5	101.8	67.3
Kentucky.....	18	630	1.0	14 14	14	4,240,795	1.3	14 13	13	1,016,709	1.3	14 12	12	-22.2	-13.5	-10.1	12.9	7.3	5.2	16.2	-11.2	30.9
Maryland.....	13	486	0.7	15 17	17	2,661,066	0.8	15 18	18	547,032	0.7	16 19	19	2.4	-12.2	16.7	51.7	39.2	9.0	59.5	27.8	24.8
Tennessee.....	25	395	0.6	18 13	13	2,529,901	0.8	16 14	14	536,187	0.7	17 14	14	-50.8	-46.3	-8.3	-9.7	-29.4	27.9	-13.3	-26.9	18.6
Indiana.....	10	398	0.6	17 20	20	2,311,299	0.7	17 21	21	598,739	0.8	15 21	21	-0.5	50.2	-33.8	45.3	119.9	-33.9	48.4	108.4	-28.8
Missouri.....	9	220	0.4	21 22	22	2,034,979	0.6	18 20	20	436,114	0.5	19 20	20	18.9	1.4	17.3	149.1	80.4	38.1	67.7	10.7	51.5
Maine.....	17	436	0.7	16 18	18	1,905,372	0.6	19 16	16	453,169	0.6	18 16	16	-25.7	-15.3	-12.3	22.3	23.8	2.0	-11.0	-13.9	3.3
Georgia.....	10	306	0.5	19 16	16	1,374,070	0.4	21 17	17	322,627	0.4	21 17	17	-25.4	-42.6	30.0	15.7	-42.3	100.5	24.2	-34.7	90.4
Connecticut.....	8	150	0.2	22 23	23	1,047,343	0.3	22 23	23	242,435	0.3	22 23	23	-16.2	-11.2	-5.6	17.5	40.0	-16.0	15.2	18.0	-2.4
All other states.....	44	533	0.9	.....	.....	3,150,510	1.0	.....	.....	811,819	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 20. A minus sign (—) denotes decrease.

Pennsylvania is by far the most important state in the manufacture of leather, ranking first at the censuses of 1909 and 1904 in average number of wage

earners, value of products, and value added by manufacture. In 1909 the value of products for the state represented 23.8 per cent of the total for the United

States. The number of wage earners employed in the industry in Pennsylvania increased 4.6 per cent during the decade ending with 1909, and the value of products 40.1 per cent. Wisconsin ranked second in 1909 in value of products and third in value added by manufacture, advancing from third place and fourth place, respectively, in 1904. Massachusetts ranked third in value of products in 1909, dropping from second place, which it held in 1904, but it ranked second at both censuses in number of wage earners and value added by manufacture. According to value of products, New Jersey ranked fourth in 1909, displacing New York, which held fourth place in 1904.

Of the 10 leading states in the leather industry (as determined by value of products), West Virginia showed the most rapid development during the period from 1899 to 1909, the number of wage earners increasing 136.6 per cent and the value of products 287.8 per cent. Wisconsin, Massachusetts, New Jersey, Michigan, and Ohio also showed high percentages of increase in all three items given in the table, while New York lost in average number of wage earners engaged in the industry. North Carolina, which, however, is not among the leading states in the industry, showed exceptionally large gains from 1899 to 1909, the number of wage earners increasing 127.3 per cent and the value of products 260.5 per cent.

In general, the states held the same, or practically the same, rank in respect to value of products in 1909 as in 1904, showing that there was no very conspicuous change in the geographic distribution of the industry during the five-year period.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	67,100	64,439	2,661
Proprietors and officials.....	2,331	2,293	38
Proprietors and firm members.....	784	759	25
Salaried officers of corporations.....	629	618	11
Superintendents and managers.....	918	916	2
Clerks.....	2,567	2,092	475
Wage earners (average number).....	62,202	60,054	2,148
16 years of age and over.....	61,753	59,674	2,079
Under 16 years of age.....	449	380	69

An average of 67,100 persons were engaged in the industry during 1909, of whom 62,202, or 92.7 per cent, were wage earners, 2,331, or 3.5 per cent, proprietors and officials, and 2,567, or 3.8 per cent, clerks and other subordinate salaried employees. Of the total number of persons engaged in the industry, 64,439,

or 96 per cent, were males, and 2,661, or 4 per cent, females. The average number of children under 16 years of age employed as wage earners was 449.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 28. This table does not show the distribution of the average number by sex and age for the individual states, but Table 29 gives such a distribution of the number employed on December 15, 1909, or the nearest representative day. Female wage earners were reported in 14 of the 25 states for which separate figures are shown. The largest number of such wage earners, 821, was reported for the state of Delaware, and the next largest number, 743, for Pennsylvania. Most of the children employed as wage earners were reported from Pennsylvania, New Jersey, Massachusetts, and Wisconsin; the proportion of children was higher in New Jersey than in any other state.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Per cent of increase: 1904-1909 ¹
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	67,100	100.0	61,602	100.0	8.9
Proprietors and firm members.....	784	1.2	1,112	1.8	-29.5
Salaried employees.....	4,114	6.1	3,251	5.3	26.5
Wage earners (average number).....	62,202	92.7	57,239	92.9	8.7

¹ A minus sign (-) denotes decrease.

The decrease in the number of proprietors and firm members from 1,112 in 1904 to 784 in 1909 is accounted for by the marked decrease in establishments under individual and firm ownership, which numbered 657 in 1904 and 465 in 1909.

Table 5 shows the average number of wage earners engaged in the industry; distributed according to age periods, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. The number of women employed has increased with each succeeding census, but the number of children, though much larger in 1904 than in 1899, was materially less in 1909 than 10 years before.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	62,202	100.0	57,239	100.0	52,109	100.0
16 years of age and over.....	61,753	99.3	56,331	98.4	51,575	99.0
Male.....	59,674	95.9	54,517	95.2	50,402	96.7
Female.....	2,079	3.3	1,814	3.2	1,173	2.3
Under 16 years of age.....	449	0.7	908	1.6	534	1.0

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the industry on the 15th (or nearest representative day) of each

month during the year 1909 for the 14 states in which an average of 500 or more wage earners were employed during the year.

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		United States.....	62,202	82,063	62,373	61,726	60,095	60,075	60,559	61,039	61,166	62,049	63,383	65,174	66,694
California.....	1,398	1,379	1,389	1,400	1,376	1,862	1,359	1,366	1,422	1,457	1,449	1,392	1,433
Delaware.....	3,045	2,848	2,935	2,948	2,875	2,930	2,979	3,010	2,994	3,125	3,210	3,234	3,456
Illinois.....	3,001	3,030	3,024	3,005	3,024	2,907	2,839	2,990	2,958	2,951	3,007	3,071	3,208
Kentucky.....	630	676	651	602	598	610	614	604	631	639	614	652	667
Massachusetts.....	10,252	10,398	10,364	10,269	9,708	9,839	9,844	9,841	9,760	9,907	10,486	10,998	11,546
Michigan.....	2,291	2,300	2,245	2,228	2,190	2,239	2,235	2,313	2,348	2,368	2,332	2,298	2,382
New Jersey.....	5,560	5,453	5,614	5,516	6,364	5,394	5,323	5,305	5,460	5,612	5,721	5,855	5,960
New York.....	5,688	5,796	5,856	5,792	5,519	5,237	5,600	5,605	5,685	5,668	5,827	5,950	6,023
North Carolina.....	832	728	729	722	765	846	848	881	874	883	883	912	915
Ohio.....	1,884	1,806	1,831	1,864	1,827	1,794	1,759	1,784	1,780	1,895	2,004	2,109	2,175
Pennsylvania.....	14,008	13,723	13,735	13,793	13,698	13,587	13,894	13,797	13,610	14,103	14,392	14,874	14,890
Virginia.....	1,590	1,504	1,495	1,487	1,511	1,587	1,704	1,687	1,710	1,664	1,586	1,585	1,560
West Virginia.....	1,571	1,440	1,431	1,443	1,452	1,485	1,544	1,675	1,760	1,666	1,650	1,659	1,647
Wisconsin.....	7,548	8,034	8,127	7,763	7,343	7,395	7,590	7,434	7,272	7,106	7,310	7,445	7,723

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

In the United States as a whole, the largest number of wage earners reported for any month of 1909 was 66,694, in December, and the smallest number, 60,075, in May, the minimum number being equal to 90.1 per cent of the maximum. In 9 of the 14 states named the greatest activity in the industry occurred during December. The increase toward the latter part of the year was probably due, at least in part, to general improvement in industrial conditions. In 1904 the maximum number for the industry as a whole was reported for March, and the minimum number, which was equal to 97.2 per cent of the maximum, was reported for January.

The months of maximum and minimum employment for 1909 and the number of wage earners reported for these months are given for each state in Table 29.

Prevailing hours of labor.—In Table 7 the wage earners in the leather industry have been classified according to the hours of labor per week prevailing in the establishments in which they are employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or less number of hours.

Nearly nine-tenths (89.5 per cent) of the wage earners employed in the industry in 1909 were in establishments where the prevailing number of hours of labor was more than 54 but not over 60 per week. Ten hours a day is the common working time, with a part holiday in some cases. Seven per cent of the wage earners were employed in establishments where the usual hours were 54 per week, and only 3.5 per cent in establishments where the hours were less than 54 per week. In the majority of the states for which separate figures are shown a larger number were employed in establishments where the prevailing hours of labor were 60 per week than were employed in the

establishments in any of the other groups. In Massachusetts, however, 80.9 per cent of the total number of wage earners reported for the state were employed in establishments operating more than 54 but less than 60 hours per week, and in New Jersey 82.3 per cent were in such establishments.

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	62,202	572	1,578	4,380	24,682	30,931	2	7
California.....	1,398	2	67	1,193	116	20		
Delaware.....	3,045		33	620	250	2,092		
Illinois.....	3,001		313	37	1,197	1,454		
Kentucky.....	630		163	199	64	214		
Massachusetts.....	10,252	155	108	120	8,292	1,577		
Michigan.....	2,291				519	1,772		
New Jersey.....	5,560	180	245	115	4,578	442		
New York.....	5,688	18	226	211	2,470	2,763		
North Carolina.....	832		1		8	820	2	
Ohio.....	1,884	95	1	815	367	606		
Pennsylvania.....	14,008	65	139	708	5,187	7,904		5
Virginia.....	1,590	1	49	1	31	1,506		2
West Virginia.....	1,571		1	68	128	1,374		
Wisconsin.....	7,548			13	717	6,818		

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of establishments in the industry.

CHARACTER OF OWNERSHIP.	Value of products.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	918	1,049	\$327,874,187	\$252,620,988
Individual ¹	259	368	16,745,360	21,487,288
Firm.....	206	290	60,832,453	62,397,239
Corporation.....	454	391	250,296,374	168,736,461
Per cent of total.....	100.0	100.0	100.0	100.0
Individual ¹	28.2	35.1	5.1	8.5
Firm.....	22.4	27.6	18.6	24.7
Corporation.....	49.4	37.3	76.3	66.8

¹ Includes one establishment under "other" ownership in 1904.

The most important distinction is that between corporate and all other forms of ownership. In 1909, of the total number of establishments reported for the industry, 49.4 per cent were under corporate ownership, as compared with 37.4 per cent in 1904. While corporations thus controlled less than one-half of the total number of establishments in 1909, the value of the products of these establishments represented 76.3 per cent of the total value of products for all establishments engaged in the industry in that year. The corresponding proportion in 1904 was decidedly lower, 66.8 per cent.

Of the total number of wage earners reported in 1909, as shown by Table 9, 4,326, or 7 per cent, were employed in establishments under individual ownership; 11,482, or 18.5 per cent, in those under firm ownership; and 46,394, or 74.6 per cent, in those owned by corporations.

Table 9 gives statistics with respect to form of ownership for each state for which an average of more than 500 wage earners were reported at the census of 1909.

There was considerable variation among the different states as to the relative importance of the establishments operated under the three forms of ownership. Thus, in West Virginia, establishments controlled by corporations constituted 70 per cent of the total number of establishments, and gave employment to 95.4 per cent of the wage earners and reported 94.1 per cent of the value of products. In Delaware, on the other hand, while corporations controlled 56.2 per cent of the establishments, these establishments gave employment to only 30.7 per cent of the wage earners and contributed but 31.1 per cent of the total value of products of the industry in the state, a few large establishments operated by firms doing the major part of the business.

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	259	206	454	4,326	11,482	46,394	\$16,745,360	\$60,832,453	\$250,296,374	\$5,158,064	\$14,857,002	\$59,580,188
California.....	9	5	26	101	108	1,189	662,497	692,813	8,011,230	168,198	154,037	2,004,857
Delaware.....	3	4	9	217	1,892	980,432	980,432	7,337,670	3,761,123	290,656	2,456,423	1,185,296
Illinois.....	4	9	16	201	325	2,475	1,086,872	1,684,428	12,140,482	218,334	359,538	2,203,301
Kentucky.....	1		17	(X)		630	(X)		4,240,795	(X)		1,016,709
Massachusetts.....	42	30	60	1,039	1,546	7,667	2,413,413	4,571,004	33,017,662	1,131,280	1,651,555	8,453,736
Michigan.....	1	2	21	(X)	(X)	2,291	(X)	(X)	16,331,104	(X)	(X)	3,210,133
New Jersey.....	18	23	45	264	1,312	3,984	1,612,248	7,807,588	19,011,119	497,259	2,127,855	5,607,371
New York.....	41	35	33	1,133	1,728	2,827	3,783,188	9,202,647	14,656,548	1,188,789	1,892,428	3,620,433
North Carolina.....	18	11	10	34	145	653	102,093	1,667,374	3,646,028	24,923	358,907	875,514
Ohio.....	7	8	21	49	56	1,779	283,779	374,017	9,470,040	70,983	99,856	2,237,393
Pennsylvania.....	39	36	88	779	2,272	10,957	2,882,720	13,992,835	61,050,766	820,670	3,080,233	14,912,294
Virginia.....	17	7	15	19	140	1,431	28,649	1,158,446	7,079,755	14,534	316,013	1,491,142
West Virginia.....	3	3	14	(X)	72	1,499	(X)	739,060	11,711,532	(X)	106,008	1,961,383
Wisconsin.....	3	8	21	10	1,423	6,115	17,560	8,895,151	35,754,965	11,728	1,706,347	8,121,016

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under other forms of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

Size of establishments.—Table 10 groups the establishments reported in 1909 and 1904 according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	LEATHER, TANNED, CURRIED, AND FINISHED.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	919	1,049	\$327,374,187	\$252,820,988
Less than \$5,000.....	121	171	276,306	367,636
\$5,000 and less than \$20,000.....	117	166	1,242,071	1,784,182
\$20,000 and less than \$100,000.....	193	244	9,875,058	12,911,730
\$100,000 and less than \$1,000,000.....	410	420	158,569,294	146,000,213
\$1,000,000 and over.....	78	48	157,911,458	91,557,225
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	13.2	16.3	0.1	0.1
\$5,000 and less than \$20,000.....	12.7	15.8	0.4	0.7
\$20,000 and less than \$100,000.....	21.0	23.3	3.0	5.1
\$100,000 and less than \$1,000,000.....	44.6	40.0	48.4	57.8
\$1,000,000 and over.....	8.5	4.6	48.2	36.2

Of the 919 establishments reported for 1909, only 78, or 8.5 per cent, manufactured products valued at \$1,000,000 or over, but such establishments reported 48.2 per cent of the total value of products. Such large establishments had a materially greater propor-

tion of the business in 1909 than in 1904, but this may be due, at least in part, to the effect of advance in prices, causing certain establishments to advance from the lower class into this class without any increase in the quantity of their output.

On the other hand, the small establishments manufacturing products valued at less than \$20,000 constituted 25.9 per cent of the total number of establishments in 1909, but the value of their products amounted to only one-half of 1 per cent of the total.

The average value of products per establishment increased from \$240,821 in 1904 to \$356,773 in 1909, and the average value added by manufacture from \$58,572 to \$86,611. These increases are due partly to the increase in the relative number of very large establishments and partly to the increase in prices during the five-year period.

Table 11 gives, for 1909, a classification of the establishments according to the number of wage earners and shows the average number of wage earners employed by establishments of each group for each of the 14 leading states.

Table 11

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—																
	Es-tab-lish-ments.	Wage earners (average number).	No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
			Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.....	919	62,202	30	213	480	166	2,184	200	8,809	150	10,956	118	17,869	26	8,021	14	9,617	4	5,266
California.....	40	1,398	.....	10	27	11	163	10	328	6	424	3	456	.....	.....	.....	.....	.....	.....
Delaware.....	16	3,045	.....	.....	.....	2	39	3	110	3	255	6	903	.....	.....	1	598	1	1,140
Illinois.....	29	3,001	.....	3	5	7	93	4	137	5	367	7	1,126	2	620	1	653	.....	.....
Kentucky.....	18	630	.....	2	3	7	97	5	163	3	243	1	124	.....	.....	.....	.....	.....	.....
Massachusetts.....	132	10,252	.....	20	60	28	350	40	1,356	23	1,652	15	2,385	.....	.....	5	3,128	1	1,321
Michigan.....	24	2,291	1	.....	.....	3	53	7	288	4	339	8	1,311	1	300	.....	.....	.....	.....
New Jersey.....	86	5,560	1	8	24	24	335	27	916	6	415	15	2,375	5	1,495	.....	.....	.....	.....
New York.....	109	5,688	4	21	51	23	306	28	810	18	1,338	12	1,953	3	1,230	.....	.....	.....	.....
North Carolina.....	39	832	3	25	38	3	41	1	42	5	381	2	330	.....	.....	.....	.....	.....	.....
Ohio.....	36	1,884	1	11	26	5	53	12	366	3	219	3	452	.....	.....	1	768	.....	.....
Pennsylvania.....	163	14,008	7	25	57	22	281	24	849	50	3,565	22	3,119	10	3,574	3	2,563	.....	.....
Virginia.....	39	1,590	4	16	23	.....	.....	8	309	4	272	7	986	.....	.....	.....	.....	.....	.....
West Virginia.....	20	1,571	1	4	4	.....	.....	5	214	4	288	5	759	1	306	.....	.....	.....	.....
Wisconsin.....	32	7,548	.....	5	16	4	50	5	157	5	393	4	724	4	1,496	3	1,907	2	2,805

Of the 919 establishments reported in the country as a whole, 3.3 per cent employed no wage earners, 23.2 per cent employed from 1 to 5, 18.1 per cent from 6 to 20, and 21.8 per cent from 21 to 50. The most numerous single group consists of the 213 establishments employing from 1 to 5 wage earners. There were 18 establishments that employed over 500 wage earners each, and of these 4 employed over 1,000 each.

Of the total number of wage earners, 4.3 per cent were reported by establishments employing from 1 to 20, 28.6 per cent by establishments employing from 21 to 100, 43.2 per cent by establishments employing from 101 to 500, and 23.9 per cent by establishments employing over 500.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of depreciation, and consequently can not be used for determining profits. Facts of interest can, however, be brought out concerning the relative importance of the different classes of expense which were reported. Table 12 shows, in percentages, for the 12 states in which the reported expenses for 1909 amounted to more than \$5,000,000, the distribution of these expenses among the classes indicated.

Table 12

STATE.	PER CENT OF TOTAL EXPENSES REPORTED: 1909			
	Salaries.	Wages.	Materials.	Miscellaneous expenses.
United States.....	2.2	10.5	81.2	8.1
California.....	2.4	11.2	80.2	6.1
Delaware.....	3.3	13.0	77.3	6.4
Illinois.....	1.9	10.7	82.3	5.1
Massachusetts.....	2.5	14.5	76.8	6.1
Michigan.....	1.6	8.0	86.0	4.4
New Jersey.....	3.0	13.6	79.3	4.1
New York.....	2.7	11.3	81.1	4.9
Ohio.....	2.1	11.5	82.1	4.2
Pennsylvania.....	1.8	9.2	80.3	8.6
Virginia.....	2.3	7.8	85.2	4.7
West Virginia.....	1.7	6.6	86.6	5.3
Wisconsin.....	1.7	9.5	83.0	5.9

Table 1 shows the total reported expenses in 1909 for the industry in the United States as a whole to have been \$305,699,411, divided as follows: Materials, \$248,278,933, or 81.2 per cent; wages, \$32,102,845, or 10.5 per cent; salaries, \$6,743,636, or 2.2 per cent; and miscellaneous expenses, \$18,573,997, or 6.1 per cent. The comparatively slight variations among the several states in the proportions of the different classes of expenses are due largely to differences in the extent to which custom tanning or finishing is done, since the cost of the hides and skins tanned or finished for establishments not assigned to the leather industry does not enter into the cost of materials reported. Among the 12 principal states shown in Table 12 there was a variation in the proportion of the total expenses represented by cost of materials from 76.8 per cent in Massachusetts to 86.6 per cent in West Virginia.

Engines and power.—The amount of power used in the industry was first reported at the census of 1869. Table 1 shows that the total horsepower increased from 39,583 in 1869 to 148,140 in 1909.

Table 13 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current), and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the total number and horsepower of electric motors, including those operated by current generated in the establishments themselves.

The total primary power used in the industry increased from 88,860 horsepower in 1899 to 148,140 in 1909, or 66.7 per cent. The greater part of the increase was in the power of steam engines and of gas and other internal combustion engines. In 1909, as in 1904 and 1899, steam power formed the major part of the primary power employed in the industry, but its relative importance has decreased since 1899. In that year it formed 94.8 per cent of the total primary power; in 1909, 88.6 per cent.

Table 13

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	2,065	1,807	1,641	148,140	117,450	88,860	100.0	100.0	100.0
Owned.....	1,590	1,665	1,641	140,238	114,591	87,329	94.7	97.6	98.3
Steam.....	1,440	1,524	1,507	131,311	107,510	84,229	88.6	91.5	94.8
Gas.....	104	77	25	7,231	5,086	866	4.9	4.3	1.0
Water wheels.....	45	62	109	1,546	1,935	2,231	1.0	1.6	2.6
Water motors.....	1	2	(¹)	10	20	(¹)	(²)	(²)	(²)
Other.....				140	40	3	0.1	(²)	(²)
Rented.....	475	142	(¹)	7,902	2,859	1,531	5.3	2.4	1.7
Electric.....	475	142	(¹)	6,487	2,014	863	4.4	1.7	1.0
Other.....				1,415	845	668	1.0	0.7	0.7
Electric motors	2,340	731	206	35,919	14,539	3,920	100.0	100.0	100.0
Run by current generated by establishment.....	1,865	589	206	29,432	12,525	3,057	81.9	86.1	78.0
Run by rented power.....	475	142	(¹)	6,487	2,014	863	18.1	13.9	22.0

¹ Not reported.

² Less than one-tenth of 1 per cent.

There has been a marked increase in the horsepower of gas and other internal combustion engines and of electric motors operated by purchased current. The horsepower of electric motors operated by current

generated in the manufacturing establishments reporting increased from 3,057 in 1899 to 29,432 in 1909.

Table 14 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in the 14 states for which statistics have been presented in previous tables.

The largest amounts of power were reported for Pennsylvania, Massachusetts, Wisconsin, New York, and New Jersey, the five leading states in the industry, as measured by the number of wage earners employed, the total for these states amounting to 97,291 horsepower, or 65.7 per cent of the total for the United States. Steam power was the most important form of power in every state for which separate statistics are presented. The largest amount of steam power, 32,079 horsepower, is shown for Pennsylvania, which state also reported the largest amount of power generated by gas and other internal combustion engines, 5,134 horsepower, or 71 per cent of the total for such power for the United States. Rented electric power was reported for all the states shown in the table except Virginia and West Virginia, but the largest amount, 1,286 horsepower, is shown for New York.

Table 14

STATE.	Number of establishments reporting.	Total horsepower.	PRIMARY HORSEPOWER.							ELECTRIC HORSEPOWER.		FUEL USED.					
			Owned by establishments reporting.					Rented.		Total rented and generated by establishments.	Generated in the establishments reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States...	629	148,140	140,238	131,311	7,231	1,556	140	6,487	1,415	35,919	29,432	98,724	1,026,215	806	20,143	46,129	588,532
California.....	40	3,534	2,802	2,705	97			732		1,932	1,200	232	2,297		717	45,322	
Delaware.....	16	4,417	4,315	4,315				102		424	322		26,661				66
Illinois.....	28	6,789	6,322	6,322				367	80	915	548	2,702	56,105				
Kentucky.....	17	2,669	2,651	2,566	85			18		148	130		22,177				94,898
Massachusetts.....	122	19,231	17,776	17,601	75	100		844	611	4,365	3,521	17,226	114,138	236	261	304	472
Michigan.....	24	6,719	5,877	5,873	4			842		2,085	1,243	1,500	66,554		52	1	
New Jersey.....	79	9,243	8,306	8,184	22	100		847	90	2,203	1,356	14,569	77,345	192	5	125	698
New York.....	101	14,265	12,709	10,985	1,294	415	16	1,286	270	2,817	1,531	25,327	78,802	30	59	248	19,430
North Carolina.....	21	2,672	2,334	2,106	4	99	125	337	1	771	434		14,472		1,110	27	
Ohio.....	34	4,244	4,100	4,100				134	10	2,086	1,952		45,516	133		11	34
Pennsylvania.....	153	37,440	37,259	32,079	5,134	46		91	90	6,406	5,315	26,089	279,191	187	6,733	26	393,031
Virginia.....	27	4,223	4,123	4,003	14	106			100	443	443	4,723	15,069		30	1	
West Virginia.....	19	5,305	5,305	4,914	391					664	664		41,357		2,156	3	89,010
Wisconsin.....	32	17,112	17,066	17,016	50			46		9,478	9,432	2,745	136,439	10	695		845
All other states.....	116	10,297	9,293	8,542	61	690		841	163	2,182	1,341	3,611	52,042	18	8,325	61	48

Fuel consumed in the industry.—Closely related to the subject of the kind of power employed is that of the fuel consumed in generating this power or otherwise used. The amount expended for fuel and rent of power in the leather industry in 1909 was \$3,292,831. This item is shown by states in Table 29. The amount of each kind of fuel consumed is shown in Table 14. Bituminous coal was the principal kind of fuel used, 1,028,215 tons being consumed in the in-

dustry as a whole during 1909. Of anthracite coal, 98,724 tons were used, Pennsylvania, with 26,089 tons, and New York, with 25,327 tons, being the largest consumers. Spent tanbark is utilized for fuel in many tanneries, and by some the amount so used was reported. The larger proportion of the establishments, however, kept no account of it and were unable to make any estimate, so that the data reported have not been tabulated.

SPECIAL STATISTICS OF MATERIALS AND PRODUCTS AND CUSTOM WORK.

The special schedule used in collecting the statistics for the leather industry required a detailed report of the quantity and cost of the different kinds of purchased materials used during the year, the number and estimated value of the hides or skins treated under contract for other establishments, and the quantity and value of the different products manufactured for sale. This special schedule was used not only for establishments assigned to the leather industry itself, but also for establishments assigned to other industries which incidentally tanned, curried, or finished leather.

Total number of hides and skins used by establishments in the leather industry and in other industries.—Table 15 shows, for the United States as a whole, the total number of hides and skins used in the manufacture of leather in 1909 and 1904, distinguishing those treated by establishments in the industry from those treated by establishments assigned to other industries, and distinguishing purchased hides and skins from those furnished by others. The figures given for hides and skins treated under contract represent only those treated for concerns not assigned to the leather industry, as hides and skins so treated for other establishments in the industry are reported by those establishments among their materials.

MATERIAL AND CENSUS YEAR.	HIDES AND SKINS TREATED.				
	Aggregate.	By establishments assigned to the industry "leather, tanned, curried, and finished."			By establishments assigned to other industries.
		Total.	Purchased.	Treated under contract for concerns not in the industry.	
Hides and skins:					
1909.....	146,328,586	145,881,151	116,040,986	29,840,165	447,435
1904.....	131,011,956	130,960,218	108,206,677	22,753,541	51,738
Hides:					
1909.....	20,516,332	20,283,693	18,360,415	1,903,278	252,639
1904.....	18,555,497	18,643,044	17,581,613	961,431	12,453
Skins:					
1909.....	125,812,254	125,617,458	97,680,571	27,936,887	194,796
1904.....	112,456,459	112,417,174	90,625,064	21,792,110	39,285

The total number of hides and skins used by all establishments in 1909 was reported as 146,328,586, as compared with 131,011,956 in 1904, the increase during the 5-year period amounting to 11.7 per cent. Of the total number of hides and skins treated in 1909, 116,040,986, or 79.3 per cent, were owned by establishments in the leather industry itself; 29,840,165, or 20.4 per cent, were treated by such establishments under contract for other concerns not in the leather industry; and 447,435, or three-tenths of 1 per cent, were treated by establishments assigned to other industries, most of which used the leather produced in the manufacture of more highly finished products. Of the total number of hides and skins treated in 1909, cattle hides represented a little less than one-seventh and the skins of other animals—chiefly goats, sheep, and

calves—about six-sevenths. The apparently extraordinary increase shown between 1904 and 1909 in the number of hides and skins used by establishments outside the leather industry is probably due largely to the more complete segregation of this branch of the business of such establishments at the later census.

Sources of hides and skins used.—A considerable proportion of the cattle hides used for the manufacture of leather in the United States, and a very large proportion of the skins of other animals so used, are imported. By an amendment to the Thirteenth Census act the Census Bureau was required to collect, for 1909, statistics as to the total number of hides and skins taken off from domestic animals in the United States.

For this purpose the Census Bureau canvassed not only wholesale slaughtering and meat-packing establishments but also all retail slaughterhouses—which would not have been included under the general scope of the manufactures census—and in the agricultural schedule called for the number of animals slaughtered on farms and ranges. The slaughterhouses were required to report not only the number of animals of each kind slaughtered, but also the number of hides or skins taken off. In some cases the number taken off exceeds the number of animals slaughtered, because hides or skins are taken from animals dying a natural death, while, on the other hand, in some cases the hides are not taken off from animals slaughtered. The agricultural schedule did not call for the number of hides or skins taken off on farms and ranges from animals dying a natural death, and doubtless a comparatively small number should be added to the statistics herewith presented to cover these.

The results of this inquiry are presented in the following table, which also shows for comparison the total number of hides and skins treated and the ratio which the number reported as taken off in the United States bore to the number treated.

KIND OF ANIMAL.	NUMBER OF HIDES AND SKINS TAKEN OFF IN UNITED STATES: 1909			Number of hides and skins treated: 1909	Ratio of number taken off in United States to number treated (per cent).
	Total.	By slaughterhouses, rendering establishments, etc.	On farms and ranges.		
All kinds.....	33,665,169	30,476,414	3,188,755	146,328,586	23.1
Cattle.....	13,764,686	12,356,046	1,408,640	20,516,332	67.1
Calves.....	5,196,043	4,064,443	1,131,600		
Sheep and lambs.....	14,274,413	13,744,887	529,526	125,812,254	15.8
Goats and kids.....	287,497	168,508	118,989		
Horses and colts.....	114,834	114,834	.....	
All other animals.....	27,696	27,696	.....	

¹ The total number taken off, from which this ratio is computed, was 19,908,402.

The number of cattle hides reported as taken off in the United States in 1909, 13,764,686, was equal to 67.1 per cent of the number used for tanning, which was 20,516,332. The difference between the two figures is approximately 6,750,000. Most of this difference is attributable to the use of imported hides.

There was a marked increase in the importations of 1909 as compared with previous years, particularly in the latter part of the year, but because of the interval of time elapsing between importation and treating in the tanneries it is doubtful whether the number of imported hides treated during 1909 equaled the number imported during the year. For the calendar year 1909 the total imports of cattle hides aggregated 279,114,262 pounds. Returns from the slaughtering establishments in the United States indicate an average weight per hide in 1909 of about 53 pounds. If the imported hides were of the same average weight the number of pounds imported in 1909 would be equivalent to about 5,266,000 hides. The excess of the number of hides treated over the number reported as taken off plus the number imported may be attributable to various possible causes, such as incompleteness in the returns of hides taken off, reduction of stocks on hand, error due to the assumption that the imported hides have the same weight as the domestic, or minor errors in the returns of imports or of number treated.

The number of skins other than cattle hides reported as taken off in the United States in 1909 was 19,900,483, or less than one-seventh as many as were treated. It is impossible to calculate the number of skins imported, as statistics are given only for weight, and there is no means of determining the average weight with any approach to accuracy. The number imported is, however, very great. During the calendar year 1909 there were imported 115,547,176 pounds of goatskins, 63,587,930 pounds of sheepskins, and 114,793,137 pounds of skins of other animals (not including fur skins),¹ the great bulk of the last-named item consisting of calfskins and horsehides.

Purchased materials used in the leather industry proper.—Table 17 shows in detail the quantity and cost of the various classes of purchased materials used in the leather industry in 1909, 1904, and 1899, together with the percentages of increase between 1899 and 1909. The number of hides and skins given does not include those treated under contract for establishments not in the leather industry, and none of the statistics include data for establishments assigned to industries other than "leather, tanned, curried, and finished" which do their own tanning or finishing. There is a comparatively small amount of duplication in the total cost of materials for the industry, due to the fact that some rough leather tanned by establishments in the industry is purchased for further treatment by other establishments in the industry.

The cost of all materials reported increased 60.2 per cent between 1899 and 1909. The number of purchased hides used increased 15.9 per cent, but the cost increased 53.5 per cent. The difference between these two percentages is due chiefly to the increase in prices,

but it may be due in part to differences in the quality or character of the hides treated. The number of skins of all kinds other than cattle hides increased 16.5 per cent between 1899 and 1909, and the cost increased 65.3 per cent. Each separate class of skins shows a decidedly greater percentage of increase in cost than in number—a fact which again is attributable chiefly, though not necessarily exclusively, to increase in prices. Approximately one-half the cost of all materials at each census covered by the table was represented by that of cattle hides, the average value of which is much greater than that of the skins of other animals used in the industry.

MATERIAL.	MATERIALS USED IN THE LEATHER INDUSTRY.			Per cent of increase: 1899-1909
	1909	1904	1899	
Total cost.....	\$248,278,933	\$191,179,073	\$155,000,004	60.2
Cattle hides:				
Number.....	18,360,415	17,581,613	15,838,862	15.9
Cost.....	\$119,410,767	\$89,126,593	\$77,784,760	53.5
Skins:				
Number.....	97,680,571	90,625,064	83,870,481	16.5
Cost.....	\$75,647,790	\$56,341,332	\$45,761,209	65.3
Calf and kip—				
Number.....	19,732,638	12,481,221	8,944,454	120.6
Cost.....	\$31,790,572	\$15,725,616	\$10,792,485	194.6
Goat—				
Dozens.....	4,006,472	3,972,134	4,003,908	0.1
Cost.....	\$27,833,214	\$26,756,012	\$24,950,223	11.6
Sheep—				
Dozens.....	2,173,505	2,291,030	2,042,304	6.4
Cost.....	\$12,231,618	\$10,547,883	\$8,457,995	44.6
All other—				
Number.....	3,788,209	2,985,881	2,371,488	59.7
Cost.....	\$3,792,386	\$3,311,821	\$1,560,506	143.0
Rough leather purchased...	\$9,556,257	\$10,852,655	\$6,663,395	43.4
Whole sides—				
Number.....	1,468,213	2,414,102	1,086,592	35.1
Cost.....	\$4,967,781	\$8,136,661	\$3,534,097	40.6
Grains—				
Sides.....	525,786	342,332	165,938	216.9
Cost.....	\$1,201,842	\$980,260	\$467,125	157.3
Splits.....	\$1,442,505	\$1,108,243	\$1,320,589	9.2
All other.....	\$1,044,129	\$627,491	\$1,341,584	44.9
Tanning materials.....	\$30,928,758	\$25,029,994	\$17,017,447	81.7
All other materials.....	\$12,735,361	\$9,828,499	\$7,773,193	63.8

Value of products of all establishments, including those not assigned to the leather industry.—It is impossible to determine from the census returns the total value of leather produced in the United States, because adequate data are not available with respect to the value of the leather made by establishments in the leather industry under contract for other establishments not assigned to the industry. It is true that establishments doing work under contract for others were required to give estimated values for the hides and skins treated, but to add up these figures would involve duplication, owing to the fact that in some cases one establishment tanned hides or skins under contract and another establishment curried and finished the same hides or skins under contract.

Table 18 shows, for 1909 and 1904, the total value of products reported by establishments in the leather industry, together with the value of leather made by establishments in other industries. The value of products for the leather industry itself represents that of products made for sale plus the receipts for custom work done for others, but does not include the value of the products of custom work done for concerns not in the leather industry.

¹ See Monthly Summary of Commerce and Finance, December, 1909, page 976.

Table 18

	VALUE OF PRODUCTS.	
	1909	1904
Total	\$334, 105, 561	\$252, 775, 918
Products of the industry "Leather, tanned, curried, and finished".....	327, 874, 187	252, 620, 986
Products manufactured for sale.....	315, 109, 409	244, 431, 026
Receipts for custom work.....	12, 764, 778	5, 189, 960
Value of leather made by establishments in other industries.....	6, 231, 374	154, 932

The increase in the value of leather made by establishments in other industries between 1904 and 1909, as shown in this table, doubtless results in large part, as already indicated, from the more complete segregation of this branch of the business of such establishments in 1909.

Products of the leather industry proper.—Table 19 shows in detail, for 1909, 1904, and 1899, the quantity and value of products of the establishments assigned to the industry "leather, tanned, curried, and finished." This table does not include the quantity or value of products of establishments assigned to other industries or the quantity or value of products treated by establishments in the industry under contract for others, but the receipts for contract work are shown. It is possible that in some cases the items for the several censuses may not be altogether comparable.

The total value of products reported by establishments in the leather industry for 1909 was \$327,874,187, of which the value of leather (\$306,476,720) represented 93.5 per cent; that of miscellaneous products (\$8,632,689), 2.6 per cent; and the receipts for contract work on materials furnished by others (\$12,764,778), 3.9 per cent. The total value of products involves some little duplication, owing to the purchase of rough leather tanned by establishments in the industry for further treatment by other establishments in the industry, and to the fact that concerns doing contract work for others in the industry report the receipts for such work, while the value of the finished product is reported by the owner.

Between 1899 and 1909 the value of products increased 60.7 per cent, or by substantially the same percentage as the cost of materials.

The quantities of the several classes of products in most cases show a materially lower percentage of increase than the values, a fact which is largely, but not of necessity exclusively, due to the increase in the prices of the finished products, which in turn is largely attributable to the increase in prices of materials already referred to. The quantity of sole leather of all kinds combined increased 15.1 per cent and its value 59.2 per cent; the production of hemlock sole leather decreased, while that of the other classes increased materially. It is doubtful, however, if the data for chrome leather are entirely comparable. The output of grain upper leather and of finished splits decreased somewhat during the decade, but according to the returns that of patent and enameled shoe leather

was more than eleven times as great in 1909 as in 1899. There was a very great increase in the production of tanned and finished calfskins and kipskins, but the production of tanned and finished goatskins increased but little and that of sheepskins decreased.

Table 19

PRODUCT.	PRODUCTS OF THE LEATHER INDUSTRY.		
	1909	1904	1899
Total value	\$327, 874, 187	\$252, 620, 986	\$204, 038, 127
Leather.....	\$306, 476, 720	\$236, 765, 803	\$194, 202, 063
Sole—			
Sides.....	17, 805, 252	17, 937, 938	15, 472, 072
Value.....	\$83, 331, 713	\$69, 205, 600	\$55, 481, 625
Hemlock—			
Sides.....	7, 963, 728	9, 929, 964	9, 810, 996
Value.....	\$32, 237, 151	\$32, 876, 015	\$29, 305, 561
Oak—			
Sides.....	3, 805, 861	3, 607, 963	2, 562, 814
Value.....	\$26, 083, 793	\$19, 157, 805	\$13, 359, 836
Union—			
Sides.....	5, 756, 227	4, 400, 011	3, 096, 162
Value.....	\$28, 375, 815	\$17, 371, 780	\$12, 807, 262
Chrome—			
Sides.....	279, 436	(1)	2, 100
Value.....	\$1, 634, 954	(1)	\$8, 966
Upper, other than calf or kip skins.....	\$39, 951, 460	\$24, 815, 835	\$25, 311, 838
Grain, satin, pebble, etc. (side leather)—			
Sides.....	7, 946, 769	6, 850, 469	8, 141, 093
Value.....	\$24, 198, 993	\$15, 487, 252	\$17, 473, 802
Finished splits—			
Number.....	8, 134, 229	6, 205, 050	8, 790, 382
Value.....	\$7, 410, 740	\$5, 993, 231	\$6, 740, 502
Patent and enameled shoe—			
Sides.....	2, 705, 291	1, 356, 777	236, 943
Value.....	\$8, 341, 727	\$3, 335, 352	\$1, 092, 534
Horsehides and coltskins—			
Number.....	1, 342, 938	1, 529, 395	223, 378
Value.....	\$4, 953, 145	\$4, 596, 065	\$843, 118
Calf and kip skins, tanned and finished—			
Number.....	19, 012, 064	12, 014, 223	8, 264, 272
Value.....	\$42, 412, 256	\$22, 508, 335	\$14, 619, 150
Grain finished—			
Number.....	17, 516, 910	10, 211, 885	7, 112, 859
Value.....	\$39, 982, 447	\$18, 996, 551	\$12, 127, 439
Flesh finished—			
Number.....	1, 495, 154	1, 802, 338	1, 151, 413
Value.....	\$2, 429, 809	\$3, 511, 784	\$2, 491, 711
Goatskins, tanned and finished—			
Number.....	47, 907, 211	45, 691, 492	47, 043, 932
Value.....	\$40, 882, 640	\$37, 887, 349	\$35, 672, 981
Black—			
Number.....	40, 351, 192	40, 019, 614	38, 176, 816
Value.....	\$33, 949, 575	\$32, 822, 282	\$29, 050, 886
Colored—			
Number.....	7, 556, 019	6, 671, 878	8, 867, 116
Value.....	\$8, 933, 065	\$5, 065, 067	\$6, 622, 095
Sheepskins, tanned and finished—			
Number.....	19, 665, 155	20, 597, 598	20, 290, 985
Value.....	\$12, 236, 687	\$11, 168, 829	\$8, 353, 755
Belting—			
Sides.....	1, 042, 070	859, 564	1, 472, 016
Value.....	\$6, 995, 133	\$4, 754, 456	\$7, 092, 773
Harness—			
Sides.....	3, 946, 235	4, 369, 561	3, 444, 616
Value.....	\$24, 802, 734	\$20, 274, 188	\$16, 712, 056
Carriage, automobile, and furniture—			
Hides.....	1, 398, 842	827, 104	619, 741
Value.....	\$14, 266, 742	\$7, 780, 804	\$5, 748, 387
Trunk, bag, and pocketbook.....	\$6, 198, 544	\$4, 920, 750	\$2, 611, 326
Bookbinders'.....	\$2, 450, 155	\$2, 283, 761	\$1, 688, 413
Glove.....	\$4, 913, 543	\$3, 344, 614	\$3, 084, 837
Sold in rough.....	\$6, 335, 599	\$10, 180, 949	\$6, 864, 345
All other.....	\$11, 746, 369	\$13, 044, 268	\$10, 117, 454
All other products.....	\$8, 632, 689	\$7, 665, 223	\$5, 514, 395
Work on materials for others.....	\$12, 764, 778	\$8, 189, 960	\$4, 321, 669

¹ Not reported separately.

² Includes wool to the value of \$2,474,193, reported as a subsidiary product of the industry. In addition, wool valued at \$11,597 was reported by establishments tanning leather for their own use in the manufacture of leather gloves and mittens and other leather goods.

Of the total value of leather reported for 1909, \$306,476,720, that of sole leather represented 28.8 per cent; that of upper leather other than calf and kip skins, 13 per cent; that of calfskins and kipskins, 13.8 per cent; that of goatskins, 13.3 per cent; that of sheepskins, 4 per cent; and that of all other kinds of leather, 27 per cent.

Contract work on materials furnished by others.—The following table shows the number of hides and skins of the different classes treated under contract for others in 1909, distinguishing the work done for establishments in the leather industry from that done for establishments in other industries. It also shows the estimated value of the products in each case.

CLASS OF WORK.	WORK DONE UNDER CONTRACT.		
	Total.	For establishments in the leather industry.	For establishments in other industries.
Hides tanned:			
Number—			
1909.....	2,203,068	981,383	1,221,685
1904.....	1,287,914	860,918	426,996
Estimated value of the product, 1909.	\$19,365,901	\$6,815,249	\$12,550,652
Skins tanned:			
Number—			
1909.....	12,323,117	2,435,281	9,887,836
1904.....	15,926,245	2,646,632	13,279,613
Estimated value of the product, 1909.	\$8,909,512	\$1,505,908	\$7,403,604
Sides and splits curried and finished:			
Number—			
1909.....	2,577,335	2,577,335	.....
1904.....	721,751	721,751	.....
Estimated value of the product, 1909.	\$7,187,108	\$7,187,108	.....
Skins curried and finished:			
Number—			
1909.....	22,939,052	4,890,001	18,049,051
1904.....	15,881,124	3,672,590	12,208,534
Estimated value of the product, 1909.	\$18,197,438	\$4,159,730	\$14,037,708

The estimated value of the leather made from the hides and skins treated for other establishments in the leather industry has no particular significance, as the value of the finished products has already been included in the total value of products for the leather industry, being reported in each case by the establishment for which the work was done. On the other hand, the estimated value of the leather made from the hides and skins treated for establishments in other industries has not been included in the total value of products given elsewhere, because, as already stated, it is improper to add together the values given for the several items, since the same hides or skins may be reported twice, once as tanned and again as curried and finished.

Leather produced by establishments assigned to other industries.—The following table shows, for 1909, the quantities and values of the several classes of leather produced by establishments not assigned to the industry "leather, tanned, curried, and finished."

PRODUCT.	LEATHER PRODUCTS OF ESTABLISHMENTS ASSIGNED TO OTHER INDUSTRIES: 1909	
	Quantity.	Value.
Total.....		\$6,095,108
Sole leather.....sides..	52,456	149,434
Hemlock.....sides..	6,472	46,541
Oak.....sides..	44,734	95,093
Chrome.....sides..	1,250	7,800
Upper leather, other than colt, kip, or calf.....sides..	106,588	506,962
Grain, satin, pebble, etc.....number..	58,110	462,621
Finished splits.....number..	58,110	44,341
Calf and kipekins, tanned and finished (grain finished).....	2,806	9,592
Goatskins, tanned and finished.....	116,193	113,045
Sheepskins, tanned and finished.....	11,441	7,339
Belting leather.....sides..	593,606	3,651,945
Harness leather.....sides..	22,468	127,550
Glove leather.....		63,414
All other leather, including offal leather.....		1,465,825

Most of the leather produced by these establishments was used by them in further manufacture, but some was doubtless sold as leather.

Imports and exports of leather.—Table 22 shows, for the fiscal years 1909, 1904, and 1899, respectively, the value of the exports and imports of the different classes of leather as distinguished by the Bureau of Foreign and Domestic Commerce. It will be noted that the total value of exports in each year was greatly in excess of that of imports, and that the total value of exports showed a very considerable increase during the period covered, which, however, was partly attributable to increase in prices.

CLASS.	YEAR ENDING JUNE 30—		
	1910	1905	1900
EXPORTS.			
Total value.....	\$37,414,175	\$28,058,342	\$21,787,157
Sole leather.....	8,307,880	9,444,873	6,433,303
Kid (glazed).....	10,926,255	1,576,204	1,909,914
Patent or enameled leather.....	367,601	166,320	101,708
Splits, buff, grain, and all other upper leather.....	15,620,336	15,057,791	11,913,256
All other leather.....	2,192,103	1,813,154	1,438,976
IMPORTS.			
Total value.....	7,607,923	5,812,642	6,519,173
Skins for morocco.....	1,993,884	2,446,481	3,134,657
Calskins, tanned, or tanned and dressed.....	269,582		
Patent, japanned, varnished, or enameled leather.....	236,764	605,960	132,674
Upper leather, dressed and finished.....	972,617		
Chamois and other leather, bookbinders' calfskins, kangaroo, sheep, and goat skins, including lamb and kid skins, dressed or finished.....	1,356,133	2,560,201	3,251,841
All other leather.....	2,778,943		

Quantity and cost of materials and quantity and value of products, by states.—The remaining tables of this section present statistics of the quantity and cost of materials, quantity and value of products, and contract work done, for individual states. Statistics are shown only for the states which have some importance with respect to the given class of materials or products, and in some cases it has been necessary to omit data for states of considerable importance in order to avoid the disclosure of individual operations.

Table 23 shows the number of hides and skins used by establishments in the leather industry proper in 1909, 1904, and 1899, and the cost in 1909. It does not include data for establishments assigned to other industries, nor materials treated under contract.

Table 24 shows the cost of materials other than hides and skins used by establishments in the leather industry in 1909.

Table 25 shows the quantity of each of the principal classes of leather manufactured by establishments in the leather industry in 1909, 1904, and 1899, respectively, together with the value in 1909.

Table 26 presents statistics as to stock tanned or curried and finished by establishments in the leather industry under contract for other establishments in the same industry.

Table 27 presents similar statistics as to stock tanned or curried and finished by establishments in the leather industry under contract for other establishments not in the leather industry.

LEATHER, TANNED, CURRIED, AND FINISHED—HIDES AND SKINS USED BY ESTABLISHMENTS IN THE INDUSTRY, NOT INCLUDING THOSE TREATED UNDER CONTRACT FOR OTHERS NOT IN THE INDUSTRY, BY STATES.

Table 23

MATERIAL AND STATE.	NUMBER.			COST: 1909	MATERIAL AND STATE.	NUMBER.			COST: 1909
	1909	1904	1899			1909	1904	1899	
Total				\$195,058,657					
Cattle hides	18,360,415	17,581,613	15,838,862	119,410,787	Calf and kip skins—Contd.	<i>Dozens.</i>	<i>Dozens.</i>	<i>Dozens.</i>	
California.....	611,421	634,417	585,188	4,300,834	Wisconsin.....	6,986,673	3,633,271	2,819,911	\$12,379,808
Georgia.....	151,993	284,503	143,757	787,911	All other states.....	642,754	588,692	302,758	1,274,251
Illinois.....	863,923	707,441	748,978	3,859,429	Goatskins	4,008,472	3,972,134	4,003,908	27,833,214
Indiana.....	180,485	119,754	174,910	1,842,004	Delaware.....	926,760	917,825	780,314	6,609,900
Kentucky.....	285,938	325,826	377,676	2,488,219	Massachusetts.....	524,996	624,427	810,427	3,935,024
Maine.....	177,464	279,491	404,988	764,051	New Jersey.....	531,142	284,320	414,974	3,607,128
Maryland.....	184,648	163,734	138,495	1,445,883	New York.....	26,177	87,285	145,957	143,269
Massachusetts.....	1,251,036	1,126,634	1,029,535	6,603,898	Pennsylvania.....	1,926,476	2,015,378	1,821,183	12,909,125
Michigan.....	1,430,885	1,126,456	751,935	8,022,645	All other states.....	70,921	39,899	31,053	628,768
Missouri.....	100,318	95,875	66,865	884,203	Sheepskins	2,173,605	2,291,030	2,042,304	12,231,618
New Jersey.....	771,193	562,709	395,317	8,254,676	California.....	110,726	125,839	115,132	926,139
New York.....	1,639,497	1,569,750	2,000,132	10,473,699	Delaware.....	77,126	38,617	14,606	389,301
North Carolina.....	364,766	280,197	160,484	3,202,437	Illinois.....	130,219	172,162	105,277	922,466
Ohio.....	514,226	403,655	415,762	5,179,537	Maine.....	41,282	169,400	134,739	193,089
Pennsylvania.....	5,449,826	5,447,947	4,848,759	30,118,025	Massachusetts.....	727,557	720,423	627,454	3,277,748
Tennessee.....	195,164	355,798	319,802	1,549,013	New Jersey.....	220,420	142,923	81,338	1,324,517
Virginia.....	626,712	588,397	430,608	5,002,619	New York.....	640,946	593,702	555,484	3,214,723
West Virginia.....	1,038,368	711,378	358,643	7,313,004	Pennsylvania.....	203,752	200,184	162,478	1,160,130
Wisconsin.....	2,471,848	2,457,195	2,106,986	16,373,708	All other states.....	121,477	145,775	245,796	823,505
All other states.....	250,724	340,456	380,044	1,444,972	All other skins	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	
Calf and kip skins	19,732,838	12,481,221	8,944,454	31,790,572	California.....	3,788,209	2,985,881	2,371,488	3,792,386
California.....	113,449	107,834	122,167	302,613	Illinois.....	82,047	112,720	196,319	77,921
Illinois.....	3,008,618	2,291,548	1,478,832	5,532,850	Massachusetts.....	379,182	139,367	33,700	435,177
Massachusetts.....	5,439,226	4,009,400	2,229,559	7,910,409	New Jersey.....	223,752	56,890	47,946	129,705
Michigan.....	918,668	312,951	350	881,805	New York.....	1,028,454	693,138	717,597	1,258,721
New Jersey.....	373,206	109,436	553,900	544,758	New York.....	868,120	655,034	1,050,302	841,351
New York.....	2,107,584	1,135,591	1,048,722	2,751,764	Pennsylvania.....	80,401	1,234,680	108,544	208,685
Pennsylvania.....	142,464	292,500	388,205	212,316	Wisconsin.....	234,226	19,769	150,382	611,789
					All other states.....	892,027	74,283	66,898	229,087

LEATHER, TANNED, CURRIED, AND FINISHED—COST OF MATERIALS OTHER THAN HIDES AND SKINS, BY STATES: 1909.

Table 24

STATE.	Rough leather purchased.	TANNING MATERIALS.		All other materials.	STATE.	Rough leather purchased.	TANNING MATERIALS.		All other materials.
		Chemicals.	All other.				Chemicals.	All other.	
United States	\$9,558,267	\$5,538,261	\$25,390,497	\$12,735,361	New Jersey.....	\$1,859,624	\$762,221	\$1,326,466	\$1,260,359
California.....	44,020	83,966	837,100	456,359	New York.....	381,413	331,410	2,117,211	705,893
Delaware.....	(*)	437,947	2,750	407,437	North Carolina.....	(*)	17,107	689,026	98,410
Georgia.....	(*)	9,904	159,168	78,993	Ohio.....	112,630	14,109	962,714	293,409
Illinois.....	41,693	242,685	786,443	308,905	Oregon.....	(*)	1,380	38,972	12,776
Indiana.....	(*)	2,524	197,094	136,745	Pennsylvania.....	2,692,729	1,712,235	7,721,269	2,378,610
Kentucky.....	(*)	61,647	562,242	93,580	Tennessee.....	(*)	6,866	340,235	33,093
Maine.....	(*)	36,120	226,329	224,714	Virginia.....	(*)	31,144	999,874	250,518
Maryland.....	60,432	20,956	288,271	131,061	West Virginia.....	(*)	144,899	1,764,268	645,018
Massachusetts.....	2,018,080	787,962	1,924,542	2,178,142	Wisconsin.....	(*)	536,185	2,526,218	1,646,045
Michigan.....	(*)	220,295	1,406,765	855,078	All other states.....	2,365,636	59,759	192,742	268,113
Missouri.....	(*)	16,940	340,800	212,093					

¹ In addition, purchased rough leather costing \$2,773,584, chemicals costing \$38,228, and other tanning materials costing \$360,768 were reported by establishments engaged primarily in the manufacture of leather goods.
² Included in "all other states," to avoid disclosure of individual operations.

LEATHER, TANNED, CURRIED, AND FINISHED—PRODUCTS OF ESTABLISHMENTS IN THE INDUSTRY, NOT INCLUDING CONTRACT WORK FOR OTHERS NOT IN THE INDUSTRY, BY STATES.

Table 25

PRODUCT AND STATE.	QUANTITY.			VALUE: 1909	PRODUCT AND STATE.	QUANTITY.			VALUE: 1909
	1909	1904	1899			1909	1904	1899	
SOLE LEATHER.					SOLE LEATHER—continued.				
All kinds	<i>Sides.</i>	<i>Sides.</i>	<i>Sides.</i>	\$88,331,713	Hemlock—Continued.	<i>Sides.</i>	<i>Sides.</i>	<i>Sides.</i>	
California.....	17,806,252	17,837,838	15,472,072	3,100,226	Wisconsin.....	558,474	1,038,181	1,628,888	\$2,885,899
Kentucky.....	472,236	575,393	558,063	2,712,069	All other states.....	566,796	1,377,797	1,810,513	2,360,700
Michigan.....	404,382	393,808	442,975	7,326,276	Oak	3,805,861	3,607,863	2,562,814	28,083,793
New Jersey.....	1,603,512	1,353,293	914,954	1,015,495	California.....	429,716	575,393	556,063	2,940,734
New York.....	120,600	(*)	(*)	5,933,249	Kentucky.....	404,382	393,808	442,975	2,712,069
North Carolina.....	1,138,461	1,195,988	1,446,242	2,678,110	Tennessee.....	195,547	229,568	205,942	1,224,690
Pennsylvania.....	371,668	74,883	31,389	39,904,180	Virginia.....	673,757	563,907	333,366	4,878,935
Tennessee.....	9,207,352	9,476,139	8,183,522	1,224,690	West Virginia.....	153,495	424,824	195,874	1,157,270
Virginia.....	195,547	229,568	205,942	4,878,935	All other states.....	1,948,964	1,420,463	828,594	13,170,095
West Virginia.....	673,757	563,907	409,166	1,278,164	Union	6,756,227	4,400,011	3,098,162	28,375,816
Wisconsin.....	1,933,037	1,262,538	363,954	4,414,972	New York.....	512,365	485,207	401,879	2,309,420
All other states.....	839,371	1,091,531	1,630,988	17,194,852	Pennsylvania.....	3,875,802	3,472,046	2,366,322	17,973,900
	845,331	1,720,892	1,286,877	4,867,347	West Virginia.....	1,068,360	349,348	107,745	5,557,999
Hemlock	7,803,728	9,329,984	9,810,998	32,237,151	All other states.....	501,700	113,410	160,216	2,534,496
Michigan.....	1,372,968	1,353,293	889,954	6,234,805	Chrome	279,436	(*)	2,100	1,634,954
Pennsylvania.....	4,752,308	5,672,327	5,481,306	17,194,852	California.....	42,520	(*)	(*)	159,492
West Virginia.....	713,182	488,366	336	3,560,895	All other states.....	236,916	(*)	2,100	1,475,462

¹ Exclusive of oak sole leather, to avoid disclosure of individual operations.

² Not reported separately.

LEATHER, TANNED, CURRIED, AND FINISHED—PRODUCTS OF ESTABLISHMENTS IN THE INDUSTRY, NOT INCLUDING CONTRACT WORK FOR OTHERS NOT IN THE INDUSTRY, BY STATES—Continued.

Table 25—Continued. PRODUCT AND STATE.	QUANTITY.			VALUE: 1909	PRODUCT AND STATE.	QUANTITY.			VALUE: 1909
	1909	1904	1899			1909	1904	1899	
UPPER LEATHER, OTHER THAN COLT, KIP, OR CALF SKINS.					GOATSKINS, TANNED AND FINISHED.				
All kinds.....				\$39,951,460	All kinds.....	<i>Number.</i> 47,907,211	<i>Number.</i> 45,681,492	<i>Number.</i> 47,043,932	\$40,882,640
Illinois.....				3,472,587	California.....	10,360	3,000	6,400	24,294
Massachusetts.....				11,145,235	Delaware.....	11,005,282	10,928,313	9,368,769	10,232,463
Michigan.....				3,087,888	Massachusetts.....	8,837,401	6,878,955	8,958,118	4,852,505
New Jersey.....				2,272,399	New Jersey.....	6,340,030	3,481,123	4,869,191	5,025,936
New York.....				5,825,075	New York.....	565,831	1,033,155	1,801,518	407,876
Pennsylvania.....				1,821,432	Pennsylvania.....	23,822,008	22,909,407	21,602,861	19,975,045
Wisconsin.....				10,777,605	All other states.....	326,283	457,539	343,875	364,521
All other states.....				1,549,259					
Grain, satin, pebble, etc. (side leather).....	<i>Sides.</i> 7,046,769	<i>Sides.</i> 8,850,469	<i>Sides.</i> 8,141,093	24,198,993	Black.....	40,351,192	40,019,614	38,176,818	33,849,575
California.....	24,268	22,780	60,603	83,776	Delaware.....	7,698,249	9,396,211	7,803,193	6,942,060
Illinois.....	932,482	364,950	932,188	3,058,427	Massachusetts.....	3,810,919	4,972,847	5,001,784	3,176,182
Massachusetts.....	1,509,748	1,881,547	1,859,287	4,174,700	New Jersey.....	5,800,833	3,466,523	3,416,489	4,573,552
New York.....	1,509,259	1,622,303	2,130,820	4,484,136	New York.....	298,008	873,155	1,798,518	193,050
Wisconsin.....	2,741,257	1,923,636	1,308,648	8,824,653	Pennsylvania.....	22,415,255	20,823,993	19,828,129	18,691,232
All other states.....	1,229,755	1,035,253	1,849,549	3,573,301	All other states.....	327,928	386,885	328,703	373,499
Finished splits.....	<i>Number.</i> 8,134,229	<i>Number.</i> 6,205,050	<i>Number.</i> 8,780,382	7,410,740	Colored.....	7,556,019	5,671,878	8,887,116	6,933,065
California.....	42,600	83,832	7,520	28,825	Delaware.....	3,307,043	1,632,102	1,560,576	3,290,403
Illinois.....	613,045	160,800	974,992	414,160	Massachusetts.....	2,026,482	1,908,100	3,954,334	1,676,323
Massachusetts.....	2,742,777	2,357,182	3,581,012	4,567,535	New Jersey.....	539,203	14,608	1,552,702	452,384
All other states.....	4,735,807	3,603,236	4,228,858	4,000,220	New York.....	267,823	160,000	3,000	214,826
Patent and enameled shoe leather.....	<i>Sides.</i> 2,705,291	<i>Sides.</i> 1,356,777	<i>Sides.</i> 238,943	8,341,727	Pennsylvania.....	1,406,753	1,985,414	1,774,832	1,283,813
Massachusetts.....	1,490,165	506,450	18,650	4,003,000	All other states.....	8,715	73,654	21,672	15,316
Pennsylvania.....	127,952	392,000	2,500	468,208					
All other states.....	1,087,174	458,327	215,793	3,870,519					
HORSEHIDES AND COLTSKINS.					SHEEPSKINS, TANNED AND FINISHED.				
Total.....	<i>Number.</i> 1,342,938	<i>Number.</i> 1,529,395	<i>Number.</i> 223,378	\$4,963,145	Total.....	<i>Number.</i> 18,665,155	<i>Number.</i> 20,597,698	<i>Number.</i> 20,290,985	\$12,236,687
California.....	9,427	3,600	.....	34,757	California.....	601,802	1,012,816	1,135,250	237,476
Illinois.....	101,875	134,893	100,000	356,760	Illinois.....	1,142,669	1,696,713	1,263,323	716,605
New York.....	91,887	50,019	16	285,213	Maine.....	495,384	2,032,800	1,940,870	293,616
Pennsylvania.....	628,556	1,234,119	6,268	2,413,861	Maryland.....	166,204	112,750	330,890	77,730
All other states.....	513,193	106,764	117,094	1,862,554	Massachusetts.....	8,162,771	6,892,980	8,590,563	4,254,219
					New Jersey.....	1,901,020	1,228,500	1,457,988	1,529,969
					New York.....	3,469,260	4,768,772	2,997,036	2,406,610
					Pennsylvania.....	1,772,091	1,090,180	1,090,822	1,267,974
					All other states.....	1,953,954	1,762,087	2,487,243	1,452,488
CALF AND KIP SKINS, TANNED AND FINISHED.					BELTING, HARNESS, AND CARRIAGE AND AUTOMOBILE LEATHER.				
All kinds (except patent and enameled).....	<i>Number.</i> 19,012,084	<i>Number.</i> 12,014,223	<i>Number.</i> 8,264,272	\$42,412,258	Belting leather.....	<i>Sides.</i> 1,042,070	<i>Sides.</i> 859,564	<i>Sides.</i> 1,472,016	\$8,985,133
California.....	127,852	106,571	122,152	408,957	Massachusetts.....	58,719	230,870	226,443	370,505
Illinois.....	2,454,294	2,293,950	1,455,154	6,318,353	Virginia.....	352,712	103,870	263,107	2,065,331
Massachusetts.....	5,418,677	3,793,447	2,248,254	10,910,406	All other states.....	630,639	524,824	982,466	4,559,197
Michigan.....	846,707	312,591	150	1,127,919	Harness leather.....	3,948,235	4,369,561	3,444,616	24,802,734
New Jersey.....	371,666	26,607	10,750	886,533	California.....	383,264	339,041	379,323	2,571,122
New York.....	2,012,971	1,121,632	964,855	3,615,634	Indiana.....	238,385	231,192	193,777	1,542,273
Pennsylvania.....	145,139	243,956	387,230	334,602	Kentucky.....	160,750	187,632	206,748	920,920
Wisconsin.....	7,016,824	3,542,849	2,792,755	17,305,820	Maryland.....	18,180	11,765	16,634	128,818
All other states.....	617,934	572,620	282,972	1,534,032	Michigan.....	214,879	195,695	212,386	1,210,132
Flesh finished.....	1,495,154	1,802,338	1,151,413	2,429,809	Missouri.....	153,870	124,219	72,386	1,222,229
Massachusetts.....	902,548	88,377	6,335	1,117,149	New York.....	237,198	184,182	146,341	1,648,537
All other states.....	592,606	1,713,961	1,145,078	1,312,660	Ohio.....	363,981	309,434	336,015	2,540,892
Grain finished.....	17,516,810	10,211,885	7,112,859	39,882,447	Pennsylvania.....	257,044	518,178	450,352	1,960,650
California.....	122,269	37,883	37,152	392,873	Tennessee.....	58,012	49,111	53,105	290,949
Massachusetts.....	4,516,129	3,705,070	2,241,919	9,793,257	Virginia.....	61,814	35,235	26,350	313,566
New York.....	2,012,971	1,121,432	917,765	3,615,634	Wisconsin.....	1,331,925	1,504,944	961,966	7,987,575
Pennsylvania.....	142,549	236,113	297,218	327,474	All other states.....	466,933	678,933	389,233	2,405,062
Wisconsin.....	6,649,090	2,986,130	2,379,098	16,498,267	Carriage and automobile leather.....	<i>Hides.</i> 900,131	<i>Hides.</i> 822,838	<i>Hides.</i> 518,605	\$3,363,063
All other states.....	4,073,902	2,175,257	1,239,707	9,354,942	New Jersey.....	583,001	342,897	382,562	5,695,315
					Ohio.....	200,229	167,702	85,661	2,652,443
					All other states.....	116,901	112,237	50,582	1,005,310

LEATHER, TANNED, CURRIED, AND FINISHED—PRODUCTS OF ESTABLISHMENTS IN THE INDUSTRY, NOT INCLUDING CONTRACT WORK FOR OTHERS NOT IN THE INDUSTRY, BY STATES—Continued.

Table 25—Continued. PRODUCT AND STATE.	VALUE.			PRODUCT AND STATE.	VALUE.		
	1909	1904	1899		1909	1904	1899
MISCELLANEOUS CLASSES OF LEATHER.				MISCELLANEOUS CLASSES OF LEATHER—continued.			
Trunk, bag, and pocketbook leather	\$8,198,544	\$4,920,750	\$2,811,328	Rough leather sold—Continued.			
Massachusetts.....	645,264	372,896	316,646	New Jersey.....	\$1,234,065	\$873,093	\$453,053
Michigan.....	476,862	788,535	107,763	New York.....	599,947	836,408	1,130,248
New Jersey.....	1,467,097	1,069,360	906,733	Pennsylvania.....	1,182,142	2,298,589	1,318,801
New York.....	376,978	109,834	379,586	Wisconsin.....	226,950	687,114	377,728
All other states.....	3,232,343	1,980,125	900,598	All other states.....	2,440,005	4,953,794	2,981,678
Bookbinders' leather	2,450,185	2,283,761	1,688,413	All other leather, including offal			
New Jersey.....	1,502,657	1,235,594	975,089	leather.....	11,746,369	13,044,288	10,117,454
All other states.....	947,498	1,048,167	713,324	California.....	844,568	680,318	531,690
Glove leather	4,913,543	3,344,614	3,084,837	Illinois.....	1,033,833	573,641	769,264
California.....	733,587	530,480	525,507	Indiana.....	507,013	8,000	253,056
New York.....	2,074,701	1,218,868	1,860,388	Kentucky.....	208,425	212,951	139,905
Wisconsin.....	1,358,618	870,321	342,672	Massachusetts.....	740,425	1,765,070	957,817
All other states.....	746,637	724,945	356,270	Michigan.....	729,972	78,842	222,196
Furniture leather	4,913,874	2,327,647	918,999	Missouri.....	176,195	37,374	165,370
New Jersey.....	3,141,425	1,684,893	569,442	New York.....	2,044,001	4,398,345	2,085,865
New York.....	468,512	132,612	42,654	New Jersey.....	1,430,785	576,690	1,006,011
Ohio.....	1,082,354	431,937	228,600	North Carolina.....	225,645	183,321	156,328
All other states.....	221,353	78,205	78,303	Ohio.....	209,746	282,584	375,906
Rough leather sold	6,335,539	10,180,949	6,864,345	Oregon.....	113,171	158,818	89,742
California.....	210,051	352,799	309,405	Pennsylvania.....	1,978,239	1,936,054	1,177,820
Massachusetts.....	442,439	179,152	293,434	Virginia.....	492,244	580,054	399,846
				Wisconsin.....	290,420	458,832	819,067
				All other states.....	921,684	1,104,874	967,571

LEATHER, TANNED, CURRIED, AND FINISHED—STOCK TANNED OR CURRIED AND FINISHED BY ESTABLISHMENTS IN THE INDUSTRY UNDER CONTRACT FOR OTHER ESTABLISHMENTS IN THE INDUSTRY, BY STATES.

Table 26 KIND AND STATE.	NUMBER.		ESTIMATED VALUE OF PRODUCT: 1909	KIND AND STATE.	NUMBER.		ESTIMATED VALUE OF PRODUCT: 1909
	1909	1904			1909	1904	
Hides tanned	881,383	880,918	\$8,816,249	Sides and splits curried or finished	2,877,335	721,751	\$7,187,108
Massachusetts.....	49,153	111,550	276,472	Massachusetts.....	2,244,321	267,417	5,954,779
New Jersey.....	545,027	324,161	2,805,480	New Jersey.....	53,700	436,564	270,275
North Carolina.....	52,326	5,327	732,564	New York.....	110,696	.....	110,862
Pennsylvania.....	245,490	179,337	1,925,350	Pennsylvania.....	139,326	.....	744,247
All other states.....	89,387	240,543	1,075,383	All other states.....	29,292	17,770	106,945
Skins tanned	2,435,281	2,646,632	1,505,908	Skins curried or finished	4,890,001	3,872,590	4,159,730
California.....	59,428	118,856	118,856	Maine.....	489,900	.....	202,627
Illinois.....	35,455	75,648	75,648	Massachusetts.....	2,563,610	1,191,589	1,836,018
Maine.....	1,182,137	1,352,784	372,176	New Jersey.....	300,100	84,491	156,075
Massachusetts.....	446,342	609,559	267,025	New York.....	486,246	502,005	439,588
New York.....	249,820	194,200	166,473	Pennsylvania.....	1,049,960	1,894,155	1,524,960
Pennsylvania.....	375,624	16,185	328,671	All other states.....	185	350	462
Wisconsin.....	53,456	24,000	137,437				
All other states.....	33,019	549,904	39,622				

LEATHER, TANNED, CURRIED, AND FINISHED—STOCK TANNED OR CURRIED AND FINISHED BY ESTABLISHMENTS IN THE INDUSTRY UNDER CONTRACT FOR OTHER ESTABLISHMENTS NOT IN THE INDUSTRY, BY STATES.

Table 27 KIND AND STATE.	NUMBER.		ESTIMATED VALUE OF PRODUCT: 1909	KIND AND STATE.	NUMBER.		ESTIMATED VALUE OF PRODUCT: 1909
	1909	1904			1909	1904	
Hides tanned	1,221,685	426,096	\$12,550,552	Sides curried or finished	1,363,187	1,070,669	\$5,314,073
Maryland.....	21,348	32,200	352,036	Maine.....	16,586	.....	112,356
Massachusetts.....	90,591	218,377	647,084	Maryland.....	50,747	.....	268,930
Michigan.....	54,340	9,730	616,179	Massachusetts.....	1,115,217	1,070,387	4,312,216
New York.....	18,271	25,652	169,189	New Jersey.....	115,600	.....	435,100
North Carolina.....	67,871	136	818,674	Pennsylvania.....	17,010	12	76,545
Pennsylvania.....	458,541	29,460	3,126,520	All other states.....	48,027	270	108,928
Tennessee.....	110,581	155	1,808,248	Splits curried or finished	938,137	341,763	1,156,805
Virginia.....	54,245	5,116	884,154	Massachusetts.....	740,889	336,988	936,778
West Virginia.....	278,185	37	3,395,536	New York.....	172,800	3,765	201,600
Wisconsin.....	65,058	1,410	710,784	All other states.....	24,448	1,000	18,427
All other states.....	2,654	103,823	22,250	Skins curried or finished	18,049,051	12,208,534	14,037,708
Skins tanned	9,887,836	13,279,613	7,403,804	Delaware.....	977,788	35,951	709,250
Maine.....	1,811,689	1,212,550	528,343	Maine.....	101,868	.....	16,978
Massachusetts.....	1,315,017	3,459,518	761,784	Massachusetts.....	9,818,397	6,290,135	6,666,431
New York.....	1,827,426	4,130,992	1,637,551	New Jersey.....	331,606	251,481	256,101
Pennsylvania.....	4,990,670	4,460,002	4,285,490	New York.....	5,001,599	4,346,862	5,272,004
All other states.....	143,034	18,543	160,438	Pennsylvania.....	1,058,868	574,957	722,748
				All other states.....	758,927	709,148	394,196

Table 29	STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.			
			Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.				
						Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.		
									Maximum month.	Minimum month.								
1	United States	919	67,100	784	1,547	2,092	475	62,202	De	66,694	My	60,075	66,717	64,005	2,230	408	74	143,140
2	California	40	1,547	20	70	42	17	1,398	Se	1,457	My	1,352	1,441	1,437	.....	4	.....	3,534
3	Connecticut	8	176	5	14	4	3	150	De	167	Ap	126	167	148	19	.....	.....	356
4	Delaware	16	3,241	12	52	106	27	3,045	De	3,458	Ja	2,846	3,460	2,626	816	13	6	4,417
5	Georgia	10	327	4	12	4	1	306	Ja	359	De	267	277	277	.....	.....	.....	1,228
6	Illinois	29	3,194	26	53	99	15	3,001	De	3,208	Je	2,839	3,208	3,203	5	.....	.....	6,769
7	Indiana	10	440	5	17	14	6	398	Au	439	Mh	373	383	382	1	.....	.....	1,028
8	Iowa	3	20	4	3	.....	2	11	No ¹	14	Au ¹	8	16	13	3	.....	.....	43
9	Kentucky	18	724	1	46	41	6	630	Ja	676	Ap	598	669	668	.....	1	.....	2,669
10	Maine	17	466	10	15	4	1	436	De	520	Jy	308	521	521	.....	.....	.....	1,467
11	Maryland	13	523	15	16	23	3	466	Je	515	Ja	415	485	480	5	.....	.....	1,321
12	Massachusetts	132	11,006	112	246	309	87	10,252	De	11,546	Ap	9,708	11,309	11,105	147	49	8	19,231
13	Michigan	24	2,440	5	60	63	21	2,291	De	2,392	Ap	2,190	2,392	2,364	8	20	.....	6,719
14	Missouri	9	246	3	11	8	4	220	Au ¹	240	Ja ¹	200	221	220	.....	1	.....	519
15	New Jersey	86	6,040	71	163	203	43	5,560	De	5,990	Jy	5,303	6,000	5,836	61	103	.....	9,243
16	New York	109	6,278	132	131	247	80	5,688	De	6,023	My	5,237	6,085	5,923	140	22	.....	14,265
17	North Carolina	39	938	49	23	27	7	832	De	913	Mh	722	918	914	.....	4	.....	2,672
18	Ohio	36	2,028	24	63	42	15	1,884	De	2,175	Je	1,739	2,196	2,185	11	.....	.....	4,244
19	Oregon	8	58	7	1	1	.....	49	Je	53	Ja ¹	46	49	49	.....	.....	.....	224
20	Pennsylvania	163	14,970	151	343	388	80	14,008	De	14,890	My	13,587	14,973	14,079	682	151	61	37,440
21	Tennessee	25	463	26	19	19	4	395	Mh	429	Se	369	388	388	.....	.....	.....	1,684
22	Texas	3	13	4	1	.....	.....	8	My ¹	9	Mh	7	9	9	.....	.....	.....	40
23	Virginia	39	1,730	37	46	64	3	1,590	Au	1,710	Mh	1,487	1,561	1,524	30	7	.....	4,223
24	Washington	4	29	3	4	4	.....	18	Se	20	Au ¹	17	18	18	.....	.....	.....	120
25	West Virginia	20	1,688	13	30	72	2	1,671	Au	1,760	Fe	1,431	1,658	1,658	.....	.....	.....	6,305
26	Wisconsin	32	7,977	23	80	292	34	7,548	Fe	8,127	Se	7,106	7,722	7,388	301	33	.....	17,112
27	All other states ²	26	638	22	28	27	14	447	.....	.....	.....	.....	591	590	1	.....	.....	2,267

¹ Same number reported for one or more other months.

² All other states embrace: Alabama, 1 establishment; Arkansas, 1; Colorado, 1; Louisiana, 1; Minnesota, 5; New Hampshire, 4; North Dakota, 2; Oklahoma, 2; Rhode Island, 3; South Carolina, 1; South Dakota, 1; Utah, 2; Vermont, 2.

DETAILED STATISTICS, BY STATES: 1909.

	Capital.	EXPENSES.									Value of products.	Value added by manufacture (value of products less cost of materials).	
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.			Other.
1	\$332,726,952	\$305,699,411	\$4,229,615	\$2,514,021	\$32,102,845	\$3,292,891	\$244,986,102	\$500,047	\$1,079,898	\$473,869	\$16,520,883	\$327,874,187	\$79,595,254
2	8,535,102	8,780,949	160,059	55,066	987,550	74,336	6,965,117	2,260	20,397	1,651	514,573	9,366,545	2,327,092
3	776,708	975,971	29,534	8,271	94,538	10,494	794,414	3,700	2,936	.....	35,084	1,047,343	242,435
4	8,249,477	10,538,470	203,708	146,866	1,367,350	73,430	8,073,420	6,200	14,247	.....	653,249	12,079,225	3,932,375
5	1,266,963	1,243,306	20,638	7,535	98,704	20,492	1,030,951	.....	3,079	.....	61,907	1,374,070	322,627
6	15,974,832	14,736,180	159,964	116,908	1,582,030	151,707	11,978,902	26,278	35,181	7,310	677,900	14,911,782	2,781,173
7	2,212,874	2,097,171	35,835	18,867	204,546	21,342	1,691,218	14,338	6,211	.....	104,814	2,311,299	598,739
8	10,829	19,325	2,160	988	6,966	525	4,361	40	71	.....	4,214	28,277	23,391
9	5,969,593	3,944,125	74,934	43,183	307,593	40,784	3,183,302	810	23,294	.....	270,225	4,240,795	1,016,709
10	1,728,823	1,791,076	20,782	3,800	307,809	33,556	1,418,647	17	5,141	311	100,953	1,905,372	453,169
11	2,208,388	2,486,828	59,760	20,069	210,649	15,518	2,098,516	2,996	4,648	.....	74,672	2,661,066	547,032
12	41,196,568	37,445,910	624,805	327,018	5,443,944	607,523	28,157,985	116,996	166,112	241,533	1,759,994	40,002,079	11,236,571
13	12,012,403	14,102,199	146,018	86,130	1,133,181	194,423	11,926,548	3,160	71,405	.....	541,334	15,331,104	3,210,133
14	1,478,051	1,838,546	36,050	6,437	145,548	11,848	1,587,017	1,170	6,210	.....	44,266	2,034,979	436,114
15	18,847,079	25,477,049	516,522	255,849	3,473,174	293,894	19,904,376	54,090	64,098	27,228	887,618	28,430,955	8,232,485
16	25,755,338	25,815,974	379,701	309,022	2,911,973	318,745	20,621,988	85,282	43,114	124,240	1,021,909	27,642,383	6,701,650
17	6,753,436	4,746,258	72,220	34,385	289,502	44,428	4,111,723	60	24,185	.....	169,755	5,415,495	1,259,344
18	13,758,911	9,398,390	141,655	55,585	1,083,121	89,269	7,630,335	7,009	43,512	855	347,049	10,127,836	2,408,232
19	213,480	224,895	1,400	720	33,617	3,446	177,594	.....	927	.....	7,191	244,248	63,208
20	80,988,961	73,594,120	927,927	415,640	6,801,370	726,432	58,386,692	157,324	193,283	25,030	5,960,422	77,926,321	18,813,197
21	3,564,005	2,263,750	24,900	24,694	133,588	14,201	1,979,513	600	9,108	.....	72,146	2,529,901	536,187
22	22,410	48,790	600	.....	4,784	595	42,354	.....	87	.....	370	55,277	12,328
23	11,089,660	7,562,403	111,787	59,583	588,591	43,504	6,401,657	8,550	31,669	.....	317,062	8,266,850	1,821,689
24	136,097	109,531	4,602	1,860	13,937	2,139	83,812	.....	669	.....	2,512	116,610	30,659
25	18,164,263	11,989,676	120,130	80,788	774,922	84,708	10,298,493	.....	37,004	44,640	548,940	12,450,592	2,067,391
26	49,412,042	41,986,149	302,100	395,124	3,987,767	386,034	34,442,551	8,227	262,381	.....	2,201,965	44,667,676	9,839,091
27	2,395,639	2,482,371	51,774	42,693	211,031	29,458	1,994,416	940	10,429	1,071	140,559	2,706,107	682,233

LEATHER GLOVES AND MITTENS

(735)

THE LEATHER GLOVE AND MITTEN INDUSTRY

GENERAL STATISTICS.

Comparison with earlier censuses.—The classification "gloves and mittens, leather" includes establishments making all kinds of leather gloves, mittens, and gauntlets, lined and unlined, whether for men, for women, or for children, and whether for dress purposes or for work. From 1869 to 1899, inclusive, the classification was "gloves and mittens," and included establishments making gloves and mittens of materials other than leather, except knit gloves and mittens and rubber gloves and mittens. Fur gloves and mittens were excluded by definite instructions in 1904 and 1909. The extent to which the manufacture of fur gloves was included at prior censuses, while uncertain,

was undoubtedly small, as they are usually made by establishments making also fur goods of other classes. It is not believed that the data for the censuses prior to 1904 were sufficiently affected by the inclusion of establishments which have since been excluded to impair seriously their comparability with the figures for the later censuses.

Table 1 summarizes the statistics of the industry for each census from 1869 to 1909, inclusive.

The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	377	339	394	324	300	221	-4.3	11.2	-14.0	21.6	8.0	35.7
Persons engaged in the industry...	12,950	11,712	15,531	(²)	(²)	(²)	-16.6	10.6	-24.6	.....	.....	.....
Proprietors and firm members.....	458	427	527	(²)	(²)	(²)	-13.1	7.3	-19.0	.....	.....	.....
Salaried employees.....	1,138	640	659	(²)	(²)	(²)	72.7	77.8	-2.9	.....	.....	.....
Wage earners (average number)	11,354	10,645	14,345	8,187	7,697	4,058	(³)	6.7	(⁴)	(⁴)	(⁴)	(⁴)
Primary horsepower.....	2,889	2,725	2,165	958	(²)	89	33.4	6.0	25.9	126.0	.....	.....
Capital.....	\$16,908,671	\$10,705,599	\$9,089,809	\$5,977,820	\$3,379,648	\$2,340,550	86.0	57.9	17.8	52.1	78.9	44.4
Expenses.....	\$21,244,895	\$15,933,408	\$14,780,665	\$8,557,089	(²)	(²)	43.7	33.3	7.8	72.7	.....	.....
Services.....	\$6,019,872	\$4,424,826	\$4,729,838	\$3,109,008	\$1,655,695	\$980,549	27.3	36.0	-6.4	52.1	87.8	68.9
Salaries.....	\$1,256,042	\$584,573	\$547,320	(²)	(²)	(²)	129.5	114.9	6.8	24.8	.....	.....
Wages.....	\$4,763,830	\$3,840,253	\$4,182,518	(²)	(²)	(²)	(³)	24.0	(³)	.....	.....	.....
Materials.....	\$13,208,001	\$10,000,889	\$9,483,130	\$5,021,144	\$4,351,469	\$1,884,146	39.3	32.1	5.6	88.9	15.4	130.9
Miscellaneous.....	\$2,017,022	\$1,507,693	\$567,697	\$426,937	(²)	(²)	(³)	33.8	(³)	33.0	.....	.....
Value of products.....	\$23,630,598	\$17,740,385	\$16,926,156	\$10,103,821	\$7,379,605	\$3,998,521	39.6	33.2	4.8	67.5	36.9	84.5
Value added by manufacture (value of products less cost of materials).....	\$10,422,597	\$7,739,496	\$7,443,026	\$5,082,677	\$3,028,136	\$2,114,375	40.0	34.7	4.0	46.4	67.8	43.2
Gloves, mittens, and gauntlets manufactured, dozen pairs.....	3,368,655	3,370,146	2,895,661	(²)	(²)	(²)	16.3	(⁶)	16.4	.....	.....	.....

¹ A minus sign (—) denotes decrease. Where percentages are omitted comparable figures are not available.

² Comparable figures not available.

³ Figures for 1899 not comparable with those for 1904 and 1909 (see explanation in text).

⁴ Figures not strictly comparable.

⁵ Less than one-tenth of 1 per cent.

Substantial increases in value of products occurred during each decade covered by the table. The value of products reported for 1909 was nearly six times the value for 1869, but a part of the increase is due to the advance in prices during the 40 years. From 1899 to 1909 the value of products increased \$6,704,442, or 39.6 per cent. According to the returns there was during the decade a decided decrease in the number of wage earners, accompanied by an increase in the amount paid for contract work from \$93,795 in 1899 to \$992,216 in 1909. The figures reported, however, are misleading, owing to a change in the method of reporting the piecework done for the glove factories at the individual homes, a practice very widely prevalent in New York. In 1899 these pieceworkers were reported as wage earners and their earnings included with wages. By reason of the impossibility of ascertaining accurately the number of persons engaged in glove making at their homes or the time given to such work, the Census

Bureau determined in 1904 and 1909 not to include them among wage earners but to report the amount paid for their services as paid for contract work.

In 1909 there were 377 establishments reported, which gave employment to 12,950 persons and paid out \$6,019,872 in salaries and wages. Of the persons employed, 11,354 were wage earners. These establishments turned out products to the value of \$23,630,598, to produce which materials costing \$13,208,001 were utilized. The value added to materials by manufacture was \$10,422,597. The total value of products for the industry includes that of products other than gloves and mittens to the amount of \$1,104,737. These products consist principally of fur goods, hosiery and knit goods, boots and shoes, and leather goods.

Summary, by states.—Table 2 summarizes the more important statistics by states, the states being arranged according to the value of products reported for 1909. The states shown in this table are given

their actual ranking among all states, the rank of certain states for which data can not be presented being higher than that of some named in the table. Percentages of increase from 1899 to 1904 and from

1899 to 1909 are not shown for the average number of wage earners, since, as already explained, the figures for 1899 are not comparable with those for the later censuses.

Table 2

STATE.	Number of establishments: 1909	WAGE EARNERS.				VALUE OF PRODUCTS.				VALUE ADDED BY MANUFACTURE.				PER CENT OF INCREASE. ¹						
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number): 1904-1909	Value of products.			Value added by manufacture.		
				1909	1904			1909	1904			1909	1904		1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States...	377	11,354	100.0			\$23,630,598	100.0			\$10,422,597	100.0			6.6	39.6	33.2	4.8	40.0	34.7	4.0
New York.....	225	6,287	55.4	1	1	14,336,365	60.7	1	1	6,313,351	60.6	1	1	12.0	32.3	44.1	-8.3	39.7	48.5	-6.1
Wisconsin.....	23	1,642	14.5	2	2	2,798,537	11.8	2	2	1,161,897	11.1	2	2	17.8	452.1	26.7	335.7	518.1	33.6	362.8
Illinois.....	29	1,309	11.5	3	3	2,522,963	10.7	3	3	1,044,551	10.0	3	3	15.4	1.6	49.2	-31.9	49.2	24.6	-32.9
California.....	23	570	5.0	4	4	1,230,852	5.2	4	4	672,922	6.5	4	4	10.5	33.7	35.1	-1.1	39.0	48.9	-6.8
Iowa.....	10	234	2.1	5	7	693,062	2.9	5	5	319,747	3.1	5	5	-11.0	144.0	-0.7	145.8	101.3	-5.9	113.8
Michigan.....	9	182	1.6	7	11	386,064	1.6	6	10	147,893	1.4	6	10	71.7		101.0				
Indiana.....	3	153	1.3	9	5	225,287	1.0	8	6	73,732	0.7	11	6	-52.3	-31.2	-56.2	57.2	-40.2	-57.3	40.2
Ohio.....	6	94	0.8	12	12	132,656	0.6	10	13	49,496	0.5	13	14		-45.1	17.8	-66.6	-55.8		-53.1
New Jersey.....	6	162	1.4	8	8	135,732	0.6	11	9	76,524	0.7	10	9	-23.2	7.9	-39.3	77.8		-29.4	
Massachusetts.....	8	109	1.0	10	10	134,937	0.6	12	8	91,852	0.9	9	7	-33.9	-53.3	49.1	-8.3	-44.2	-29.2	-21.2
Washington.....	6	59	0.5	14	14	119,633	0.5	13	14	60,923	0.6	12	13			11.1				
Minnesota.....	6	37	0.3	17	13	60,902	0.3	16	15	26,378	0.3	16	15							
Pennsylvania.....	3	42	0.4	15	15	54,041	0.2	17	17	21,131	0.2	18	18							
Oregon.....	5	19	0.2	18	18	44,841	0.2	18	18	24,359	0.2	17	17							
All other states.....	15	455	4.0			748,636	3.2			337,841	3.2									

¹ Percentages are based on figures in Table 13. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or less than \$100,000 for value of products or value added by manufacture.

New York is by far the most important state in the manufacture of leather gloves and mittens, ranking first in average number of wage earners, value of products, and value added by manufacture both in 1909 and in 1904. During the decade ending with 1909 the value of products for this state increased 32.3 per cent, representing in 1909, 60.7 per cent of the total for the United States. Wisconsin, Illinois, and California ranked second, third, and fourth, respectively, both in 1909 and 1904, in average number of wage earners, value of products, and value added by manufacture. Of the four leading states in value of products, Wisconsin showed the greatest

development during the period from 1899 to 1909, the value of products increasing 452.1 per cent. Although not among the leading states in the industry, Michigan shows a remarkable increase from 1899 to 1909 in value of products, 601.8 per cent.

Production in Fulton County, N. Y.—The manufacture of leather gloves and mittens as a factory industry was first carried on in the United States in Fulton County, N. Y., and this locality has ever since been the center of the industry in this country. Table 3 shows comparative statistics for Fulton County for 1909 and 1899, and also for the two principal cities of the county.

Table 3

	FULTON COUNTY, N. Y.				GLOVERSVILLE.				JOHNSTOWN.			
	1909		1899		1909		1899		1909		1899	
	Number or amount.	Per cent of total for United States.	Number or amount.	Per cent of total for United States.	Number or amount.	Per cent of total for United States.	Number or amount.	Per cent of total for United States.	Number or amount.	Per cent of total for United States.	Number or amount.	Per cent of total for United States.
Number of establishments.....	156	41.4	166	42.1	87	23.1	101	25.6	54	14.3	49	12.4
Persons engaged in the industry.....	6,201	47.9	(¹)		4,220		(¹)		1,593		(¹)	
Proprietors and firm members.....	226	49.3	(¹)		117	25.5	(¹)		85	18.6	(¹)	
Salaried employees.....	537	47.2	250	37.9	401	35.2	171	25.9	119	10.5	72	10.9
Wage earners (average number) ²	5,438	47.9	7,931	55.3	3,702	32.6	5,183	36.1	1,394	12.3	2,316	16.1
Primary horsepower.....	832	28.8	(¹)		556	19.2	(¹)		162	5.6	(¹)	
Capital.....	\$9,698,040	57.4	\$5,517,850	60.7	\$6,439,354	38.1	\$3,660,383	40.3	\$2,721,570	16.1	\$1,686,604	18.6
Expenses.....	\$11,631,609	54.8	\$8,552,741	57.9	\$8,004,873	37.7	\$5,926,758	40.1	\$2,892,989	13.6	\$2,210,625	15.0
Services.....	\$3,050,136	50.7	\$2,625,682	55.5	\$2,188,196	36.3	\$1,872,586	39.6	\$703,495	11.7	\$644,260	13.6
Salaries.....	\$560,608	44.6	\$244,522	44.3	\$459,405	36.6	\$177,651	32.4	\$88,151	7.0	\$64,114	11.7
Wages ²	\$2,489,528	52.3	\$2,381,160	56.9	\$1,728,791	36.3	\$1,695,035	40.5	\$615,344	12.9	\$580,146	14.9
Materials.....	\$7,310,030	55.3	\$5,689,613	60.0	\$4,950,854	37.5	\$3,900,897	41.1	\$1,880,470	14.2	\$1,506,193	15.9
Miscellaneous ²	\$1,271,443	63.0	\$237,446	41.8	\$865,823	42.9	\$153,275	27.0	\$303,024	15.3	\$80,172	10.6
Value of products.....	\$12,933,788	54.7	\$9,548,603	56.4	\$8,869,706	37.5	\$6,487,227	38.3	\$3,258,382	13.8	\$2,576,048	15.2
Value added by manufacture (value of products less cost of materials).....	\$5,623,768	54.0	\$3,858,990	51.8	\$3,918,852	37.6	\$2,586,330	34.7	\$1,377,892	13.2	\$1,069,855	14.4
Gloves, mittens, and gauntlets made (dozen pairs).....	1,628,297	48.3	1,484,579	51.3	988,431	29.3	925,440	32.0	411,772	12.2	398,657	13.8

¹ Comparable figures not available.

² Figures for 1899 not closely comparable with those for 1909; see text following Table 1.

In 1909, 41.4 per cent of the total number of establishments in the industry in the United States and 54.7 per cent of the total value of products were reported from Fulton County, N. Y. The corresponding proportions for 1899 were 42.1 per cent and 56.4 per cent, respectively.

The industry is much more important in Gloversville than in Johnstown, and the increase in value of products during the decade in Gloversville, 36.7 per cent, was greater than that in Johnstown, 26.5 per cent. The decrease shown in the average number of wage earners in Fulton County and in each of the two cities, and the great increase in miscellaneous expenses, is, as already explained, due to the difference in the method of reporting piecework done in the homes of the workers.

Persons engaged in the industry.—Table 4 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction. Moreover, as already stated, the data do not cover pieceworkers working in their own homes.

CLASS	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	12,950	6,219	6,731
Proprietors and officials.....	760	714	46
Proprietors and firm members.....	458	436	22
Salaried officers of corporations.....	85	81	4
Superintendents and managers.....	217	197	20
Clerks.....	836	532	304
Wage earners (average number).....	11,354	4,973	6,381
16 years of age and over.....	11,085	4,846	6,239
Under 16 years of age.....	269	127	142

The average number of persons engaged in the leather glove and mitten industry during 1909 was 12,950, of whom 11,354, or 87.7 per cent, were wage earners; 760, or 5.9 per cent, proprietors and officials; and 836, or 6.5 per cent, clerks, which class includes other subordinate salaried employees. Of the total number of persons engaged in the industry, 6,219, or 48 per cent, were males, and 6,731, or 52 per cent, were females. The average number of children under 16 years of age employed as wage earners was 269.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 18. The average number distributed by sex and age is not shown for the individual states, but Table 19 distributes on this basis the number employed on December 15, 1909, or the nearest representative day. Female wage earners were reported from each of the states for which separate

figures are shown. Of the total number of wage earners reported for New York, 3,381, or 49.8 per cent, were females; Wisconsin reported 1,155 females, who formed 66 per cent of the total for that state; and Illinois, 872 females, who formed 64.8 per cent of the state's total.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 5. The greatest percentage of increase was in salaried employees.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				Per cent of increase: 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	12,950	100.0	11,712	100.0	10.6
Proprietors and firm members.....	458	3.5	427	3.6	7.2
Salaried employees.....	1,138	8.8	640	5.5	77.8
Wage earners (average number).....	11,354	87.7	10,645	90.9	6.7

Table 6 shows the average number of wage earners engaged in the industry, distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909 and 1904. Data for 1899 are not given because not comparable with those for the later censuses. The number of women reported for 1904 and for 1909 was practically the same, but the number of men and of children was larger in 1909.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.			
	1909		1904	
	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	11,354	100.0	10,645	100.0
16 years of age and over.....	11,085	97.6	10,419	97.9
Male.....	4,846	42.7	4,174	39.2
Female.....	6,239	54.9	6,245	58.7
Under 16 years of age.....	269	2.4	226	2.1

Wage earners employed, by months.—Table 7 gives the number of wage earners employed in the industry on the 15th (or nearest representative day) of each month during the year 1909 for the four states in which an average of 500 or more wage earners were employed during the year.

The largest number of wage earners reported for any month was 12,007, for December, and the smallest number, 10,659, for January, the minimum number amounting to 88.8 per cent of the maximum. The industry does not appear to be subject to any great changes from season to season. In 1904 the maximum number, 11,626, was reported for September and the minimum number, 9,433 (amounting to 81.1 per cent of the maximum), for January.

STATE.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909 ¹												
	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	11,354	10,659	10,885	11,145	11,139	11,188	11,333	11,299	11,372	11,590	11,683	11,961	12,007
California.....	570	<i>601</i>	556	562	562	572	551	542	556	573	598	618	644
Illinois.....	1,309	1,293	1,296	1,283	<i>1,272</i>	1,290	1,295	1,311	1,304	1,323	1,343	1,355	1,345
New York.....	6,287	<i>6,322</i>	5,989	6,045	6,045	6,109	6,163	6,228	6,320	6,513	6,619	6,809	6,756
Wisconsin.....	1,642	<i>1,456</i>	1,523	1,617	1,657	1,642	1,752	1,763	1,744	1,697	1,531	1,649	1,678

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for a greater number of states in Table 19.

Prevailing hours of labor.—In Table 8 the wage earners in the four leading states have been classified according to the number of hours of labor per week prevailing in the establishments in which they are employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or a smaller number of hours.

STATE.	AVERAGE NUMBER OF WAGE EARNERS: 1909					
	Total.	In establishments with prevailing hours—				
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.
United States	11,354	655	1,017	917	7,743	1,122
California.....	570	188	340	42	.....	.....
Illinois.....	1,309	134	99	356	679	41
New York.....	6,287	115	241	193	5,490	248
Wisconsin.....	1,642	53	64	188	875	462

Of the total number of wage earners, 68.2 per cent were in establishments operating more than 54 but less than 60 hours per week, this being the most common time of employment in the three leading states. There were no establishments in which the prevailing hours were more than 60 per week. In California, 340 wage earners, or 59.6 per cent of the total number reported for the state, were in establishments where the prevailing hours were more than 48 but less than 54 hours per week.

Character of ownership.—Table 9 presents data with respect to the character of ownership of the establishments in the industry.

The most important distinction shown is that between corporate and all other forms of ownership. In 1909, of the total number of establishments reported for the industry, 19.4 per cent were under corporate ownership, as compared with 16.2 per cent in 1904. While corporations thus controlled less than one-fifth of the total number of establishments, the value of the products of these establishments represented 42.8 per cent of the total for the industry in 1909 and 33.4 per cent in 1904. The corporate form of ownership

thus gained materially in importance between 1904 and 1909. Establishments under firm ownership, on the other hand, which constituted the most important class, as measured by value of products, in 1904, when they reported 45.1 per cent of the total, lost ground relatively during the five-year period, and by 1909 had dropped to second place.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	377	329	\$23,630,598	\$17,740,385
Individual.....	190	179	4,222,329	3,803,889
Firm.....	114	105	9,301,612	8,006,267
Corporation.....	73	55	10,106,657	5,930,219
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	50.4	52.8	17.9	21.4
Firm.....	30.2	31.0	39.4	45.1
Corporation.....	19.4	16.2	42.8	33.4

Although not shown in the table, there is considerable variation among the states in the proportion of the total value of products contributed by establishments under the several forms of ownership. In New York corporations controlled 10.2 per cent of all establishments in the industry, these establishments giving employment to 21.2 per cent of the wage earners, and contributing 24.4 per cent of the total value of products. In Wisconsin, the second state in the industry, corporations controlled 60.9 per cent of the total number of establishments, these establishments giving employment to 83.6 per cent of the wage earners and reporting 90.1 per cent of the value of products.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products. Owing to the advance in prices, some establishments may have risen from one class in 1904 to a higher class in 1909 without any actual increase in the amount of output.

Of the 377 establishments reported for 1909, only 3 manufactured products valued at \$1,000,000 or over; these establishments, however, reported 13.1 per cent of the total value of products for the industry. In 1904 there were no establishments of this class. The greater part of the manufacturing was done in establishments having products valued at \$100,000 but less than \$1,000,000, such establishments reporting 56 per cent of the total value of products in 1909 and 60.9 per cent in 1904. On the other hand, the smaller establishments—that is, those manufacturing products valued at less than \$20,000—constituted 51.5 per cent of the

total number of establishments in 1909, but the value of their products amounted to only 6.5 per cent of the total.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	377	339	\$23,630,598	\$17,740,385
Less than \$5,000.....	77	75	201,786	203,794
\$5,000 and less than \$20,000.....	117	92	1,339,783	1,063,202
\$20,000 and less than \$100,000.....	123	124	5,751,826	5,677,772
\$100,000 and less than \$1,000,000..	57	48	13,235,257	10,795,617
\$1,000,000 and over.....	3	.....	3,101,948	.....
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	20.4	22.1	0.9	1.1
\$5,000 and less than \$20,000.....	31.0	27.1	5.7	6.0
\$20,000 and less than \$100,000.....	32.6	36.6	24.3	32.0
\$100,000 and less than \$1,000,000..	15.1	14.2	56.0	60.9
\$1,000,000 and over.....	0.8	.....	13.1	.....

The average value of products per establishment increased from \$52,332 in 1904 to \$62,681 in 1909. This

increase was at least partly attributable to an advance in prices. The average number of wage earners per establishment decreased from 31.4 in 1904 to 30.1 in 1909.

Table 11 gives a classification of the establishments in the industry according to the average number of wage earners employed for the four states for which more than 500 wage earners were reported at the census of 1909.

Of the 377 establishments reported, 7.2 per cent employed no wage earners; 32.1 per cent employed from 1 to 5; 28.9 per cent from 6 to 20; 25.2 per cent from 21 to 100; and 6.6 per cent over 100. Of the total number of wage earners, 14.7 per cent were reported by establishments employing from 1 to 20; 40.8 per cent by establishments employing from 21 to 100; and 44.5 per cent by establishments employing over 100.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—													
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.	
	Estab-lish-ments.	Wage earners (average number).	Estab-lish-ments.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	
United States	377	11,354	27	121	325	109	1,343	56	1,843	39	2,795	18	2,572	7	2,476	
California.....	23	570	.....	4	11	14	168	3	120	1	76	1	195	.....	.....
Illinois.....	29	1,309	.....	6	18	5	70	12	402	5	360	.....	.....	1	459
New York.....	225	6,287	17	78	208	69	841	23	726	23	1,656	11	1,486	4	1,370	
Wisconsin.....	23	1,642	.....	5	17	5	56	3	97	4	263	4	562	2	647

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation, and consequently can not be used for determining profits. Facts of interest can, however, be brought out concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses to have been \$21,244,895, divided as follows: Materials, \$13,208,001, or 62.2 per cent; wages, \$4,763,830, or 22.4 per cent; salaries, \$1,256,042, or 5.9 per cent; and miscellaneous expenses, \$2,017,022, or 9.5 per cent. The variations in the proportions represented by the respective classes in the several states, as shown by Table 19, are due largely to differences in the grades of gloves and mittens manufactured; to the fact that, although gloves and mittens were the chief products of all establishments in the industry, fur garments, etc., were also manufactured in some of the establishments; and to the practice in some states of doing much of the work on the gloves and mittens manufactured outside the factories, the payments for such work being included with the payments for "contract work" under miscellaneous expenses, and not under wages.

Engines and power.—Table 1 shows that the total horsepower used in the industry increased from 89 in 1869 to 2,889 in 1909. Table 12 shows the number of engines, or other motors, according to their charac-

ter, employed in generating power (including electric motors operated by purchased current), and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of all electric motors, including those operated by current generated in the establishments.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	378	266	91	2,888	2,725	2,165	100.0	100.0	100.0
Owned.....	68	94	91	2,016	2,209	1,799	69.8	81.1	83.1
Steam.....	31	43	44	1,625	1,676	1,312	56.2	61.5	60.6
Gas.....	25	41	42	141	283	275	4.9	10.4	12.7
Water wheels.....	4	4	5	219	242	211	7.6	8.9	9.7
Water motors.....	8	6	(1)	31	8	(1)	1.1	0.3	.....
Other.....	.....	.....	.....	.....	.....	1	.....	.....	(2)
Rented.....	310	172	(1)	873	516	366	30.2	18.9	16.9
Electric.....	310	172	(1)	850	436	235	29.4	16.0	10.9
Other.....	.....	.....	.....	23	80	131	0.8	2.9	6.0
Electric motors.	330	176	4	1,000	472	258	100.0	100.0	100.0
Run by current generated by establishment.....	20	4	4	150	36	23	15.0	7.6	8.9
Run by rented power.....	310	172	(1)	850	436	235	85.0	92.4	91.1

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power used in the industry increased from 2,165 horsepower in 1899 to 2,889 horsepower in 1909, or 33.4 per cent. The increase was

almost entirely in steam power and in rented electric power. Steam power forms the major part of the primary power employed in the industry, but its relative importance has decreased since 1899. The rented

electric power reported increased from 235 horsepower in 1899 to 850 horsepower in 1909.

Table 18 shows the total primary horsepower used in each state in 1909, 1904, and 1899.

SPECIAL STATISTICS AS TO PRODUCTS.

Table 13 shows the quantity and value of the different classes of leather gloves, mittens, and gauntlets manufactured by establishments in this industry, as reported for 1909, 1904, and 1899.

PRODUCT.	1909	1904	1899
Total value	¹ \$23, 630, 598	¹ \$17, 740, 385	¹ \$16, 926, 156
Gloves, mittens, and gauntlets:			
Dozen pairs.....	3, 368, 655	3, 370, 146	² 2, 895, 661
Value.....	\$22, 525, 861	\$17, 122, 772	² \$16, 039, 168
Men's—			
Dozen pairs.....	2, 685, 977	2, 915, 415	2, 267, 327
Value.....	\$17, 060, 797	\$14, 515, 770	\$12, 418, 258
Lined—			
Dozen pairs.....	921, 259	1, 317, 083	952, 820
Value.....	\$5, 222, 174	\$6, 333, 081	\$4, 959, 902
Unlined—			
Dozen pairs.....	1, 664, 718	1, 598, 332	1, 314, 507
Value.....	\$11, 838, 623	\$8, 182, 689	\$7, 458, 356
Women's and children's—			
Dozen pairs.....	782, 678	454, 731	604, 330
Value.....	\$5, 465, 064	\$2, 607, 002	\$3, 470, 258
Lined—			
Dozen pairs.....	365, 477	241, 361	267, 149
Value.....	\$1, 718, 198	\$1, 030, 843	\$1, 247, 916
Unlined—			
Dozen pairs.....	417, 201	213, 370	337, 181
Value.....	\$3, 746, 866	\$1, 576, 159	\$2, 222, 342
All other products.....	\$1, 104, 737	\$617, 613	\$386, 988

¹ In addition, in 1909, gloves, mittens, gauntlets, and related products to the value of \$264,961, in 1904, gloves, mittens, and gauntlets to the value of \$166,164, and in 1899, gloves, mittens, and gauntlets to the value of \$217,157, were reported by establishments in other industries.

² Includes 24,004 dozen pairs of gauntlets, valued at \$150,652, not distributed by classes.

For the decade 1899–1909 there was an increase of 472,994 dozen pairs, or 16.3 per cent, in the total output of leather gloves, mittens, and gauntlets, while the value increased \$6,486,693, or 40.4 per cent. The number of pairs made, however, was less in 1909 than in 1904, although the value increased 31.6 per cent during the five-year period.

In 1909 the value of men's gloves, mittens, and gauntlets represented 75.7 per cent of the total, and that of women's and children's 24.3 per cent, the corresponding proportions for 1899, based on the total output for which the class was reported, being 78.2 per cent and 21.8 per cent, respectively.

During the decade the production of men's gloves, mittens, and gauntlets as reported increased 318,650 dozen pairs, or 14.1 per cent, and their value \$4,642,539, or 37.4 per cent. Between 1899 and 1909 there was a decrease of 31,561 dozen pairs, or 3.3 per cent, in the output of men's lined gloves, mittens, etc., but an increase of \$262,272, or 5.3 per cent, in their value. Men's unlined gloves, mittens, etc., were the principal class reported at each census; for the decade 1899–1909 the quantity reported increased 26.6 per cent and the value 58.7 per cent.

While, as just indicated, the output of men's gloves, mittens, and gauntlets shows a substantial increase for the decade as a whole, the figures for 1909 represent a decrease of 11.3 per cent in 1909, as compared with 1904, although there was a substantial increase in value for the five-year period amounting to 17.5

per cent. This decrease was due entirely to a falling off in the production of the lined kinds, which shows a decrease of 30.1 per cent in the number of pairs produced and of 17.5 per cent in value in 1909, as compared with 1904, the unlined kinds showing increases of 4.2 per cent in the number of pairs produced and of 44.7 per cent in value for the five-year period.

From 1899 to 1909 the reported production of women's and children's gloves, mittens, etc., increased 178,348 dozen pairs, or 29.5 per cent, while their value increased \$1,994,806, or 57.5 per cent. The production of the lined kinds increased faster relatively than that of the unlined.

Table 14 shows the number of pairs of each specific class of gloves, mittens, and gauntlets manufactured in the United States in 1909, together with the value of those of each major class.

KIND.	NUMBER OF DOZEN PAIRS.				Value.
	Total.	Lamb or sheep skin.	Kid.	All other.	
Value of all products					\$23, 630, 598
<i>Gloves, mittens, and gauntlets.</i>					
All classes	3, 368, 655	1, 842, 456	87, 858	1, 438, 341	22, 525, 861
Dress gloves, mittens, and gauntlets:					
Total	1, 418, 750	1, 114, 346	84, 301	220, 103	12, 534, 746
Men's, lined.....	302, 013	203, 187	7, 565	91, 261	2, 174, 679
Men's, unlined.....	637, 073	509, 569	37, 058	90, 446	5, 969, 644
Women's and children's, lined.....	152, 974	127, 172	4, 642	21, 160	1, 014, 863
Women's and children's, unlined.....	326, 690	274, 418	35, 036	17, 236	3, 375, 560
Working gloves, mittens, and gauntlets:					
Total	1, 949, 905	728, 110	3, 557	1, 218, 238	9, 991, 115
Men's, lined.....	619, 246	264, 476	.....	354, 770	3, 047, 495
Men's, unlined.....	1, 027, 645	204, 417	3, 557	759, 671	5, 868, 979
Boys', lined.....	212, 503	155, 404	.....	57, 099	703, 335
Boys', unlined.....	90, 511	43, 813	.....	46, 698	371, 306
All other products.....					1, 104, 737

Of the total number of pairs of gloves, mittens, and gauntlets reported in 1909, 1,842,456 dozen pairs, or 54.7 per cent, were of lamb or sheep skin; 87,858 dozen pairs, or 2.6 per cent, of kid; and 1,438,341 dozen pairs, or 42.7 per cent, of other material. The number of dress gloves, mittens, and gauntlets was 1,418,750 dozen pairs, or 42.1 per cent of the total, while working gloves, mittens, and gauntlets numbered 1,949,905 dozen pairs, or 57.9 per cent. The great bulk of the dress gloves, mittens, and gauntlets were made of lamb or sheep skin, but more than three-fifths of the working gloves, mittens, and gauntlets were made of leather other than lamb or sheep skin or kid. The average value per pair of the dress gloves, mittens, and gauntlets was considerably greater than that of those intended for working use.

Table 15 shows, by states, the number of pairs and value of the leather gloves, mittens, etc., manufactured in 1909, the numbers being given for each of the more specific classes of these products distinguished by the special census schedule, and the values for the general classes.

QUANTITY AND VALUE OF PRODUCTS, BY STATES: 1909.

Table 15	KIND.	United States.	California.	Illinois.	New York.	Wisconsin.	All other states.
	Products, total value.....	\$23,630,598	\$1,230,852	\$2,522,963	\$14,336,365	\$2,798,637	\$2,741,681
	Gloves, mittens, and gauntlets:						
	Dozen pairs.....	3,368,655	130,371	503,363	1,350,438	425,442	459,041
	Lamb or sheep skin.....	1,842,456	30,134	121,851	1,408,620	168,213	113,638
	Kid.....	87,858	1,362	7,225	67,399	9,104	2,768
	All other.....	1,438,341	98,875	374,287	374,419	248,125	342,635
	Value.....	\$22,625,861	\$1,228,220	\$2,441,798	\$14,122,640	\$2,345,771	\$2,389,432
	Dress gloves, mittens, and gauntlets:						
	Dozen pairs.....	1,418,750	10,720	30,143	1,287,618	35,850	54,419
	Lamb or sheep skin.....	1,114,346	7,036	9,434	1,046,654	6,370	44,792
	Kid.....	84,301	1,362	(1)	66,464	(1)	2,694
	All other.....	220,103	2,262	(1)	174,500	(1)	6,933
	Value.....	\$12,534,746	\$115,246	\$219,978	\$11,418,955	\$267,151	\$513,416
	Men's, lined—						
	Dozen pairs.....	302,013	473	6,866	282,069	8,982	3,623
	Lamb or sheep skin.....	203,187	271	(1)	198,343	(1)	2,477
	Kid.....	7,565	(1)	(1)	4,609	(1)	446
	All other.....	91,261	(1)	5,136	79,111	6,212	700
	Value.....	\$2,174,679	\$6,320	\$52,225	\$1,981,224	\$72,131	\$62,779
	Men's, unlined—						
	Dozen pairs.....	637,073	5,290	12,873	675,097	20,750	23,063
	Lamb or sheep skin.....	509,569	3,060	(1)	485,841	(1)	15,543
	Kid.....	37,058	545	(1)	31,197	(1)	1,516
	All other.....	90,446	1,685	(1)	58,059	(1)	6,004
	Value.....	\$5,969,644	\$50,636	(1)	\$5,405,090	(1)	\$272,899
	Women's and children's, lined—						
	Dozen pairs.....	152,974		328	142,511	(1)	8,639
	Lamb or sheep skin.....	127,172		(1)	118,639		8,255
	Kid.....	4,642		(1)	2,956	(1)	380
	All other.....	21,160			20,916	(1)	4
	Value.....	\$1,014,863		(1)	\$939,064	(1)	\$63,413
	Women's and children's, unlined—						
	Dozen pairs.....	326,690	4,957	10,076	287,941	(1)	19,094
	Lamb or sheep skin.....	274,418	3,765	6,811	243,825	(1)	18,517
	Kid.....	35,036	(1)	3,265	27,702	(1)	352
	All other.....	17,236	475		16,414	(1)	225
	Value.....	\$3,375,560	\$58,290	\$84,256	\$3,092,977	\$25,712	\$114,325
	Working gloves, mittens, and gauntlets:						
	Dozen pairs.....	1,949,905	119,651	473,220	662,820	389,592	404,622
	Lamb or sheep skin.....	728,110	23,038	112,417	361,966	161,843	68,846
	Kid.....	3,557		(1)	935	(1)	74
	All other.....	1,218,238	96,613	(1)	199,919	(1)	335,702
	Value.....	\$9,991,115	\$1,110,974	\$2,221,820	\$2,703,685	\$2,078,620	\$1,876,016
	Men's, lined—						
	Dozen pairs.....	619,246	3,924	168,839	182,748	178,828	84,907
	Lamb or sheep skin.....	264,476	825	55,740	121,592	63,971	22,348
	Kid.....						
	All other.....	354,770	3,099	113,099	61,156	114,857	62,559
	Value.....	\$3,047,495	\$35,639	\$738,837	\$887,327	\$920,615	\$465,077
	Men's, unlined—						
	Dozen pairs.....	1,027,645	112,089	272,185	239,646	115,231	288,494
	Lamb or sheep skin.....	264,417	21,620	49,914	129,735	(1)	42,047
	Kid.....	3,557		(1)	935	(1)	74
	All other.....	759,671	90,469	(1)	108,976	(1)	246,373
	Value.....	\$5,868,979	\$1,041,634	\$1,371,562	\$1,294,168	\$872,958	\$1,288,557
	Boys', lined—						
	Dozen pairs.....	212,503		7,801	101,350	85,429	17,923
	Lamb or sheep skin.....	155,404		739	80,310	70,726	3,629
	Kid.....						
	All other.....	57,099		7,062	21,040	14,703	14,294
	Value.....	\$703,335		\$26,852	\$373,753	\$233,812	\$68,918
	Boys', unlined—						
	Dozen pairs.....	90,511	3,638	24,395	39,076	10,104	13,298
	Lamb or sheep skin.....	43,813	593	6,024	30,329	(1)	822
	Kid.....						
	All other.....	46,698	3,045	18,371	8,747	(1)	12,476
	Value.....	\$371,306	\$33,701	\$84,569	\$148,437	\$51,235	\$53,364
	All other products.....	\$1,104,737	\$4,632	\$81,165	\$213,725	\$452,768	\$352,449

¹ Included in totals, but amount not shown, in order to avoid disclosure of individual operations.

Products, by states.—Table 16 shows, by states, the output and value of gloves, mittens, and gauntlets made in 1909 and 1904, classified as for dress use or for working use.

Table 16 KIND AND STATE.	PRODUCTS.		
	1909		1904
	<i>Value.</i>	<i>Doz. pairs.</i>	<i>Doz. pairs.</i>
Gloves, mittens, and gauntlets, total.....	\$22,525,861	3,368,655	3,370,149
California.....	1,226,220	130,371	114,108
Illinois.....	2,441,798	503,363	381,242
Iowa.....	493,973	98,737	104,278
New York.....	14,122,640	1,850,438	1,881,194
Wisconsin.....	2,345,771	425,442	443,842
All other states.....	1,895,459	360,304	445,482
Dress gloves, mittens, and gauntlets, total.	12,534,746	1,418,750	977,594
California.....	115,246	10,720	12,685
Illinois.....	219,978	30,143	19,885
Iowa.....	65,000	7,300	27,515
New York.....	11,418,955	1,287,618	816,706
Wisconsin.....	267,151	35,850	61,500
All other states.....	448,416	47,119	39,303
Working gloves, mittens, and gauntlets, total.	9,991,115	1,949,905	2,392,552
California.....	1,110,974	119,651	101,423
Illinois.....	2,221,820	473,220	361,357
Iowa.....	428,973	91,437	76,763
New York.....	2,703,685	562,820	1,064,488
Wisconsin.....	2,078,620	389,592	382,342
All other states.....	1,447,043	313,185	406,179

New York is by far the most important state in the manufacture of leather gloves, mittens, and gauntlets, and in 1909 reported 1,850,438 dozen pairs, valued at \$14,122,640, or 54.9 per cent and 62.7 per cent, respectively, of the corresponding totals for the United States.

California and Illinois are the only states showing an increase in the total output of gloves, mittens, etc., manufactured during the five-year period 1904-1909, the increases being 14.3 per cent and 32 per cent, respectively. New York reported 54.9 per cent of the

total output of gloves, mittens, etc., made in the United States in 1909, as compared with 55.8 per cent in 1904. There was a decrease in production in New York for the five years of 30,756 dozen pairs, or 1.6 per cent.

In the total output of dress gloves and mittens manufactured there was an increase of 441,156 dozen pairs, or 45 per cent, from 1904 to 1909. In 1909 over nine-tenths (90.8 per cent) of the total number of pairs of dress gloves and mittens for the United States were reported from New York, the proportion for 1904 being 83.5 per cent.

In the total number of pairs of working gloves, mittens, and gauntlets made, there was a decrease between 1904 and 1909 of 18.5 per cent. The three leading states in 1909, in the order of their importance, were New York, Illinois, and Wisconsin; these three states combined reported 73.1 per cent of the total output for all states in 1909 and 75.6 per cent in 1904. There was a decrease during the five-year period of 501,668 dozen pairs, or 47.1 per cent, in the output of working gloves, mittens, etc., manufactured in New York.

Imports.—Table 17 shows the value of the annual imports of leather gloves and mittens from 1900 to 1909, inclusive, as shown by the reports of the Bureau of Foreign and Domestic Commerce.

Table 17 YEAR ENDING JUNE 30—	Value.	YEAR ENDING JUNE 30—	Value.
1909.....	\$7,465,319	1904.....	\$5,095,337
1908.....	7,826,719	1903.....	5,029,278
1907.....	10,633,668	1902.....	5,366,381
1906.....	6,812,719	1901.....	5,534,259
1905.....	4,727,489	1900.....	6,107,765

DETAILED STATISTICS, BY STATES.

The principal facts derived from the census inquiry concerning the leather glove and mitten industry are presented, by states, in two general tables.

Table 18 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, items of expense, value of products, and value added by manufacture for the United States and by states.

Table 19 gives more detailed statistics for the industry for 1909.

GLOVES AND MITTENS, LEATHER—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	377	12,950	458	1,136	11,354	2,889	\$16,809	\$1,256	\$4,784	\$13,208	\$23,631	\$10,423
	1904	339	11,712	427	640	10,646	2,725	10,708	585	3,840	10,001	17,740	7,739
	1899	1 394	15,531	527	669	14,346	2,185	9,090	547	4,183	9,483	16,928	7,443
California.....	1909	23	717	21	126	570	58	1,039	129	267	568	1,231	673
	1904	22	588	21	51	516	43	604	47	223	459	911	452
	1899	23	717	30	65	622	40	433	53	225	437	921	484
Illinois.....	1909	29	1,463	33	121	1,309	657	1,093	169	519	1,478	2,523	1,045
	1904	24	1,229	30	65	1,134	560	555	63	425	852	1,691	839
	1899	25	1,910	23	108	1,779	159	791	94	660	1,234	2,484	1,250
Indiana.....	1909	3	163	3	7	153	44	200	6	48	152	225	73
	1904	6	347	5	21	321	96	178	23	87	343	514	171
	1899	5	321	6	27	288	85	179	13	62	205	327	122
Iowa.....	1909	10	305	11	60	234	236	661	71	94	373	693	320
	1904	8	320	10	47	263	295	479	41	101	358	698	340
	1899	9	234	17	43	174	275	277	31	57	125	284	159
Massachusetts.....	1909	8	129	5	15	109	21	107	13	52	43	135	92
	1904	5	177	6	7	165	51	267	6	71	135	265	130
	1899	9	218	10	7	201	62	111	4	86	124	289	165
Michigan.....	1909	9	209	9	18	182	107	138	27	59	238	386	148
	1904	8	121	6	9	106	107	85	8	35	113	192	79
	1899	5	46	3	3	38	3	29	1	12	28	55	27
Minnesota.....	1909	6	53	8	8	37	5	55	7	13	35	61	26
	1904	7	86	12	9	65	12	69	6	22	52	98	46
	1899	8	36	11	2	23	1	13	1	4	12	24	12
New Jersey.....	1909	6	172	8	2	162	26	61	2	57	59	136	77
	1904	5	239	10	18	211	13	111	10	78	115	224	109
	1899	4	136	5	.....	131	6	41	.....	47	63	126	63
New York.....	1909	225	7,195	312	596	6,287	1,003	10,537	623	2,841	8,023	14,336	6,313
	1904	194	6,185	276	296	5,613	770	6,348	263	2,131	5,666	9,946	4,250
	1899	1 244	10,562	345	328	9,889	925	6,219	295	2,716	6,317	10,836	4,519
Ohio.....	1909	6	106	6	6	94	37	68	8	32	89	139	50
	1904	8	109	7	9	93	38	94	5	29	65	118	53
	1899	10	196	15	3	178	55	168	3	55	140	253	113
Oregon.....	1909	5	26	5	2	19	6	31	2	9	20	45	25
	1904	4	22	5	1	16	10	24	.....	6	19	40	21
	1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania.....	1909	3	50	3	5	42	7	29	3	12	33	54	21
	1904	4	52	4	3	45	15	66	2	11	33	40	16
	1899	4	52	6	3	43	10	29	2	10	21	42	21
Washington.....	1909	6	74	9	6	59	10	84	6	21	59	120	61
	1904	7	62	8	1	53	15	36	1	23	55	108	53
	1899	3	20	2	3	15	.....	8	1	6	10	25	15
Wisconsin.....	1909	23	1,782	11	129	1,642	301	2,054	145	673	1,637	2,799	1,162
	1904	21	1,480	12	72	1,396	226	1,207	82	437	1,339	2,209	870
	1899	19	366	23	24	319	88	220	18	78	319	507	186
All other states.....	1909	15	506	14	37	455	371	752	46	167	411	748	337
	1904	17	695	16	31	648	474	583	28	161	367	677	310
	1899	26	717	29	43	645	456	572	31	165	448	753	305

¹ Includes a few small establishments making gloves and mittens from materials other than leather.
² Figures can not be shown without disclosing individual operations.

GLOVES AND MITTENS, LEATHER—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Average number.	Wage earners.		Total.	16 and over.		Under 16.			
					Male.	Female.		Maximum month.	Minimum month.		Male.	Female.	Male.	Female.		
															Number, 15th day of—	
United States.....	377	12,850	458	302	532	304	11,354	De 12,007	Ja 10,659	12,188	5,202	6,687	136	153	2,889	
California.....	23	717	21	29	64	33	570	De 844	Ja 501	652	256	386	6	4	58	
Illinois.....	29	1,463	33	33	64	24	1,309	No 1,355	Ap 1,272	1,345	456	838	17	34	657	
Indiana.....	3	163	3	3	3	1	153	Ja 175	Oc 128	146	51	95	.....	.....	44
Iowa.....	10	305	11	23	26	11	234	Jy ¹ 260	Ja 192	220	103	116	.....	.....	236
Massachusetts.....	8	129	5	4	6	5	109	Ja 127	Jy ¹ 89	120	35	84	.....	.....	21
Michigan.....	9	209	9	5	7	6	182	Mh 236	Au ¹ 134	248	87	149	2	10	107	
Minnesota.....	6	53	8	4	4	.....	37	Mh 48	Jy 30	39	10	29	.....	.....	5
New Jersey.....	6	172	8	1	1	.....	162	Ap 166	Se 158	163	37	128	.....	.....	26
New York.....	225	7,195	312	137	272	187	6,287	No 6,809	Ja 5,822	6,788	3,343	3,334	64	47	1,003	
Ohio.....	6	106	6	4	.....	2	94	De 97	Fe 90	96	24	72	.....	.....	37
Oregon.....	5	26	5	1	.....	1	19	Ap ¹ 21	Ja ¹ 19	20	7	13	.....	.....	6
Pennsylvania.....	3	50	3	.....	1	.....	42	Ja ¹ 47	No 37	44	15	29	.....	.....	7
Washington.....	6	74	9	4	2	.....	59	De 72	My 54	72	30	42	.....	.....	10
Wisconsin.....	23	1,782	11	40	62	27	1,642	Jy 1,753	Ja 1,455	1,749	548	1,100	46	55	301	
All other states ²	15	506	14	14	17	6	455	.....	.....	486	200	284	.....	.....	371

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States.....	\$16,908,671	\$21,244,895	\$535,862	\$720,180	\$4,763,830	\$103,048	\$13,104,963	\$129,091	\$38,326	\$992,216	\$857,389	\$23,630,588	\$10,422,597
California.....	1,039,429	1,031,751	68,270	60,871	267,240	3,166	554,764	7,113	2,838	900	66,589	1,230,852	672,922
Illinois.....	1,093,490	2,331,900	79,176	90,287	518,862	19,114	1,459,298	22,997	7,952	15,000	119,214	2,522,963	1,044,551
Indiana.....	199,697	220,724	2,629	2,171	47,788	1,317	150,238	600	750	.....	15,231	225,287	73,732
Iowa.....	661,163	627,378	34,506	36,045	93,563	4,935	368,380	5,360	1,814	.....	82,775	693,062	319,747
Massachusetts.....	107,153	116,057	5,580	7,099	52,484	1,252	41,833	2,680	463	250	4,516	134,937	91,852
Michigan.....	137,643	357,730	19,956	6,645	58,542	1,945	236,226	294	2,040	39	32,043	386,064	147,893
Minnesota.....	55,029	67,196	3,920	2,800	12,870	608	34,006	1,802	504	.....	686	60,992	26,378
New Jersey.....	61,472	121,590	1,200	330	56,561	438	58,770	2,280	188	.....	1,823	135,732	76,524
New York.....	10,536,984	12,866,261	216,839	405,881	2,840,865	50,265	7,972,749	58,691	11,138	973,856	335,977	14,336,365	6,313,351
Ohio.....	67,620	134,052	6,900	760	31,594	704	88,456	2,328	389	.....	2,921	138,656	49,496
Oregon.....	31,160	38,802	1,853	600	9,157	317	20,165	1,372	87	.....	5,251	44,841	24,359
Pennsylvania.....	28,964	48,904	.....	2,536	11,744	210	32,700	330	58	.....	1,326	54,041	21,131
Washington.....	84,468	99,231	3,480	2,500	21,313	531	58,179	2,090	351	.....	10,787	119,633	60,923
Wisconsin.....	2,053,895	2,538,120	74,859	70,608	572,526	15,392	1,621,248	15,734	7,000	2,171	158,582	2,798,537	1,161,897
All other states ²	750,504	655,199	16,694	31,047	168,721	2,854	407,941	5,520	2,754	.....	19,668	748,636	337,841

¹ Same number reported for one or more other months.² All other states embrace: Colorado, 1 establishment; Connecticut, 2; Kentucky, 1; Maryland, 1; Missouri, 2; Nebraska, 1; New Hampshire, 3; Utah, 1; Virginia, 2.

PAPER AND WOOD PULP

(747)

THE PAPER AND WOOD PULP INDUSTRY.

GENERAL STATISTICS.

SUMMARY FOR THE UNITED STATES.

Summary for the industry: 1909.—Table 1 presents a summary of the statistics for the paper and wood pulp industry as a whole for 1909. It distinguishes three classes of mills: (1) Mills making paper exclusively; (2) mills making wood pulp exclusively; and (3) mills which manufacture both pulp and paper. The pulp manufactured by the mills which produce both pulp and paper is largely made into paper in the establishments where produced. Since a large part of the business is done by mills which combine the two branches, the statistics for these three classes of mills separately have no great significance, and hence in all the tables except Table 1 only figures for the three classes of mills combined are presented. It is obvious, however, that the combined value of products and the combined cost of materials involve much duplication, amounting to approximately \$30,000,000, this being about the value reported for wood pulp manufactured for sale or for use in establishments other than the ones where it was produced.

The statistics here given do not cover the cutting or transportation of timber or pulp wood, which is often done by concerns engaged in the industry, except that the expenses connected with the production of these materials by such establishments are included with the cost of materials.

these establishments contributed products valued at \$129,381,198, or 48.3 per cent of the total value of products reported for the industry as a whole. The 81 establishments manufacturing pulp exclusively formed slightly more than one-tenth of the total number, and the value of their products represented about one-twelfth of the total value of products. The 158 establishments making both pulp and paper formed 20.3 per cent of the total number in the industry as a whole and reported 43.6 per cent of the total value of products. This group includes a number of combination pulp mills and paper mills operated as separate units but under the same ownership. In some of these cases the mills manufacturing pulp sold a certain part of their product, and in others the pulp was all used in the paper mill owned by the same company. In all, there were 82 mills of this character, of which 37 manufactured paper alone and 45 made pulp alone. The companies owning these mills made combined reports covering both branches of the industry, and the 82 mills were counted as 34 establishments.

The establishments in the industry as a whole in 1909 gave employment to an average of 81,473 persons, of whom 75,978 were wage earners, and paid \$50,314,643 in salaries and wages.

The cost of materials used in the industry as a whole in 1909 was \$165,442,341, or more than three-fifths (61.8 per cent) of the total value of products, which was \$267,656,964, and the value added by manufacture (that is, the value of products less cost of materials) was \$102,214,623. Both the value of products and the cost of materials, as already stated, involve considerable duplication, due to the sale of pulp to paper mills. The value of products of the industry in 1909 covers products other than paper and wood pulp to the value of \$3,810,768. These products consist principally of fancy and paper boxes, dyestuffs and extracts, roofing materials, and miscellaneous paper goods.

Comparison with earlier censuses.—Table 2 summarizes the statistics of the paper and wood pulp industry as a whole for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	Total.	MILLS MAKING—		
		Paper only.	Pulp only.	Both paper and pulp.
Number of establishments.	777	538	81	158
Persons engaged in the industry.....	81,473	40,807	6,554	34,112
Proprietors and firm members.....	250	215	26	9
Salaried employees.....	5,245	2,943	390	1,912
Wage earners (average number).....	75,978	37,649	6,138	32,191
Primary horsepower.....	1,304,265	(1)	(1)	(1)
Capital.....	\$409,348,505	\$148,021,260	\$38,336,179	\$222,991,066
Expenses.....	237,310,150	115,341,621	19,205,710	102,762,819
Services.....	50,314,643	24,532,636	4,027,939	21,754,068
Salaries.....	9,510,141	5,255,161	652,135	3,602,845
Wages.....	40,804,502	19,277,475	3,375,804	18,151,223
Materials.....	165,442,341	79,692,180	13,657,150	72,093,031
Miscellaneous.....	21,553,166	11,116,825	1,520,621	8,915,720
Value of products.....	267,656,964	129,381,198	21,567,432	116,708,334
Value added by manufacture (value of products less cost of materials)...	102,214,623	49,689,038	7,910,282	44,615,303

¹ Not reported separately.

Of the 777 establishments canvassed in 1909, more than two-thirds (538, or 69.2 per cent) were engaged in the manufacture of paper exclusively;

	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	777	761	763	649	742	677	1.8	2.1	-0.3	17.6	-12.5	9.6
Persons engaged in the industry.....	81,473	70,051	53,012	(2)	(2)	(2)	53.7	16.3	32.1	.....	.....	.....
Proprietors and firm members.....	250	309	431	(2)	(2)	(2)	-42.0	-19.1	-28.3	.....	.....	.....
Salaried employees.....	5,245	3,778	2,935	(2)	(2)	(2)	78.7	38.8	28.7	.....	.....	.....
Wage earners (average number).....	75,978	65,964	49,646	(2)	(2)	(2)	53.0	15.2	32.9	(2)	(2)	(2)
Primary horsepower.....	1,304,265	1,093,708	762,118	297,724	25,631	18,021	71.1	19.3	43.8	156.0	(2)	(2)
Capital.....	\$409,348,505	\$277,444,471	\$167,507,713	\$89,829,548	\$48,139,652	\$34,556,014	144.4	47.5	65.6	86.5	86.6	39.3
Expenses.....	237,310,150	165,807,763	105,961,679	65,974,646	(2)	(2)	124.0	43.1	56.5	60.6	.....	.....
Services.....	50,314,643	38,116,244	25,247,337	14,975,485	8,970,133	7,208,691	99.3	32.0	61.0	68.6	66.9	24.4
Salaries.....	9,510,141	6,097,032	4,500,911	(2)	(2)	(2)	111.3	56.0	35.5	.....	.....	.....
Wages.....	40,804,502	32,019,212	20,746,426	(2)	(2)	(2)	96.7	27.4	54.3	.....	.....	.....
Materials.....	165,442,341	111,251,478	70,530,236	44,228,480	34,862,132	30,058,563	134.6	48.7	57.7	59.5	26.9	16.0
Miscellaneous.....	21,553,166	16,440,041	10,184,106	6,770,681	(2)	(2)	111.6	31.1	61.4	50.4	.....	.....
Value of products.....	267,656,964	188,715,189	127,326,162	78,937,184	57,366,860	48,849,285	110.2	41.8	48.2	61.3	37.6	17.4
Value added by manufacture (value of products less cost of materials).....	102,214,623	77,463,711	56,795,926	34,708,704	22,504,728	18,790,722	80.0	32.0	36.4	63.6	54.2	19.8

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available. ³ Figures not strictly comparable.

Paper was manufactured in this country near Philadelphia as early as 1690. The growth of the industry, however, was slow until within the last 40 years, during which time the introduction of improved machinery and the use of wood fiber as a material have brought about a remarkable growth in the industry. In the decade 1899-1909 the value of products increased \$140,330,802, or 110.2 per cent, this percentage being higher than that for any other decade since 1869. Some part of this increase, however, was due to advance in prices, particularly during the first half of the decade.

The number of proprietors and firm members was less in 1909 than in either 1904 or 1899. The de-

crease shown is explained by changes in character of ownership as shown in Table 9. Salaried employees were included to some extent with wage earners at the earlier censuses, and comparative figures for this class, therefore, are not shown for censuses prior to that of 1899.

During the decade 1899-1909 the average number of wage earners increased 53 per cent.

Summary, by states.—Table 3 summarizes the more important statistics of the industry as a whole, by states, the states being arranged according to the value of products reported for 1909. Some states for which data can not be shown separately ranked higher than some named in the table.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹								
		Average number: 1909	Per cent of total: 1909	Rank. 1909 1904	Amount: 1909	Per cent of total: 1909	Rank. 1909 1904	Amount: 1909	Per cent of total: 1909	Rank. 1909 1904	Wage earners (average number).			Value of products.			Value added by manufacture.		
											1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States.....	777	75,978	100.0	.....	\$267,656,964	100.0	.....	\$102,214,623	100.0	.....	53.0	15.2	32.9	110.2	41.8	48.2	80.0	32.0	36.4
New York.....	178	12,073	15.9	2 1	48,859,610	18.3	1 1	17,092,327	16.7	2 1	30.3	-2.8	34.0	32.9	29.4	41.3	40.6	14.4	23.0
Massachusetts.....	88	12,848	16.9	1 2	40,096,713	15.0	2 2	17,747,100	17.4	1 2	41.8	9.8	29.2	81.1	25.3	44.6	73.6	26.2	37.6
Maine.....	45	8,647	11.4	3 3	33,950,230	12.7	3 3	13,446,017	13.2	3 3	78.3	14.2	56.1	156.7	47.9	73.6	120.3	48.0	48.8
Wisconsin.....	57	7,467	9.8	4 4	25,962,099	9.7	4 4	9,269,534	9.1	4 4	76.1	17.8	49.5	138.3	45.5	63.8	121.6	29.6	71.0
Pennsylvania.....	62	6,656	8.8	5 6	19,872,717	7.4	5 5	8,474,406	8.3	5 5	37.5	12.7	22.0	62.0	29.0	25.6	43.8	22.8	17.1
Ohio.....	47	4,673	6.2	6 6	16,965,260	6.3	6 6	6,066,975	5.9	6 6	46.8	20.3	22.0	159.2	54.8	67.5	118.6	26.2	73.3
New Hampshire.....	34	3,413	4.5	8 8	13,994,251	5.2	7 7	4,740,882	4.6	8 7	42.7	35.3	5.5	93.2	56.7	23.3	44.0	31.6	9.4
Michigan.....	32	4,327	5.7	7 7	13,922,124	5.2	8 8	4,897,529	4.8	7 8	114.8	41.8	51.5	230.1	89.6	74.0	224.3	77.4	82.8
New Jersey.....	37	2,223	2.9	9 10	7,554,428	2.8	9 9	2,785,677	2.7	9 10	86.8	36.5	36.9	136.4	49.9	67.8	88.2	37.8	36.6
Connecticut.....	51	1,720	2.3	10 9	5,527,334	2.1	10 10	2,223,918	2.2	10 9	20.7	-1.7	22.8	55.0	9.7	41.3	40.5	-3.3	45.4
Indiana.....	27	1,501	2.0	11 11	5,202,330	1.9	11 11	1,705,185	1.7	12 11	-17.3	-7.3	-10.8	24.7	32.8	-6.1	0.4	21.8	-17.6
Illinois.....	19	1,397	1.8	12 15	4,983,075	1.9	12 15	1,883,635	1.8	11 14	124.2	45.7	53.9	248.0	104.0	70.6	197.2	83.4	62.0
Maryland.....	13	1,249	1.6	13 13	4,894,041	1.8	13 13	1,615,979	1.6	13 16	33.3	23.9	7.6	89.0	48.5	27.3	88.1	91.7	-1.9
Vermont.....	25	1,030	1.4	15 12	3,901,634	1.5	14 12	1,446,279	1.4	16 12	-15.3	-19.5	5.3	15.3	1.9	13.2	-14.9	12.1	-24.1
Virginia.....	9	912	1.2	17 14	3,656,745	1.4	15 14	1,508,373	1.5	14 13	202.0	8.2	228.8	330.2	20.5	256.9	243.7	21.2	183.6
West Virginia.....	9	1,162	1.5	14 18	2,652,037	1.0	17 18	968,618	0.9	18 18	313.5	113.2	94.0	402.3	104.3	145.8	281.6	80.1	111.8
Minnesota.....	9	607	0.8	19 19	2,385,026	0.9	19 19	947,250	0.9	19 19	.....	53.3	.....	.....	.....	.....	.....	101.9	.....
Delaware.....	6	546	0.7	21 17	2,291,728	0.8	20 16	704,555	0.7	21 17	21.1	-0.2	21.3	43.3	20.3	19.1	23.3	11.0	11.0
California.....	4	312	0.4	22 21	969,172	0.4	22 21	528,777	0.5	22 21	.....	20.5	.....	.....	51.4	.....	.....	44.5	.....
Iowa.....	4	205	0.3	23 22	437,388	0.2	24 23	156,574	0.2	24 24	13.9	34.9	-15.6	79.1	72.7	3.7	13.9	27.9	-10.9
Kansas.....	3	97	0.1	25 24	217,982	0.1	25 24	97,676	0.1	26 23	.....	.....	.....	.....	7.9	.....	.....	.....	.....
All other states.....	18	2,913	3.8	.....	9,360,680	3.5	.....	3,907,457	3.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 25. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture, or where comparative figures can not be given without disclosing individual operations.

There are 31 states represented in the industry, although 79.8 per cent of the total value of products was reported by the first 8 states shown in Table 3. New York was in 1909 the most important state as measured by value of products, but ranked second in average number of wage earners and in value added by manufacture. Massachusetts, which ranked second among the states in value of products, was first in average number of wage earners and in value added by manufacture. Maine ranked third in each respect. Of the 8 states which reported products valued at \$10,000,000 or over, Michigan shows the most rapid development in the industry during the period from 1899 to 1909, the number of wage earners in this state increasing 205.6 per cent and the value of products 230.1 per cent. Still higher percentages of increase are shown for West Virginia and Virginia, in which states, however, the industry was of less importance, even in 1909.

In general the states held the same or nearly the same rank with respect to value of products in 1909 as in 1904, and most of the states had the same, or practically the same, rank in value added by manufacture in 1909 as in value of products.

PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 4 shows for 1909 the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	81,473	70,916	10,557
Proprietors and officials.....	2,298	2,269	29
Proprietors and firm members.....	250	232	18
Salaried officers of corporations.....	773	766	7
Superintendents and managers.....	1,275	1,271	4
Clerks.....	3,197	2,393	804
Wage earners (average number).....	75,978	66,254	9,724
16 years of age and over.....	75,721	66,151	9,570
Under 16 years of age.....	257	103	154

The average number of persons engaged in the operation of paper and wood pulp mills during 1909 was 81,473, of whom 75,978, or 93.3 per cent, were wage earners, 2,298, or 2.8 per cent, proprietors and officials, and 3,197, or 3.9 per cent, were clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 70,916, or

87 per cent, were males and 10,557, or 13 per cent, females. The average number of wage earners under 16 years of age was only 257.

The average number of wage earners in each state for 1909, 1904, and 1899 is given in Table 25. The average number distributed by sex and age is not shown for the individual states, but Table 26 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported as employed in 26 states, the largest number, 4,618, being reported for Massachusetts, and the next largest number, 961, for Wisconsin. The number of wage earners under 16 years of age employed in Massachusetts was 132, or practically half of the total for all states.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904 it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 5.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Per cent of increase: ¹ 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	81,473	100.0	70,051	100.0	16.3
Proprietors and firm members.....	250	0.3	309	0.4	-19.1
Salaried employees.....	5,245	6.4	3,778	5.4	38.8
Wage earners (average number).....	75,978	93.3	65,964	94.2	15.2

¹ A minus sign (-) denotes decrease.

Table 6 shows the average number of wage earners in the industry as a whole distributed according to age, and in the case of those 16 years of age or over, according to sex, for 1909, 1904, and 1899. The number of children employed was so small that the increase from 1899 to 1909 has little significance.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	75,978	100.0	65,964	100.0	49,646	100.0
16 years of age and over.....	75,721	99.7	65,709	99.6	49,477	99.7
Male.....	66,151	87.1	56,827	86.1	41,547	83.7
Female.....	9,570	12.6	8,882	13.5	7,930	16.0
Under 16 years of age.....	257	0.3	255	0.4	169	0.3

Wage earners employed, by months.—Table 7 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for 20 of the leading states in which an average of 500 or more wage earners were employed during the year.

Table 7

WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	75,978	74,988	75,780	76,291	75,983	77,013	76,829	75,009	74,517	75,147	76,028	76,717	77,430
Connecticut.....	1,720	<i>1,658</i>	1,664	1,672	1,675	1,725	1,665	1,709	1,733	1,718	1,755	1,820	1,881
Delaware.....	546	<i>566</i>	553	587	548	654	<i>530</i>	636	535	538	536	<i>530</i>	559
Illinois.....	1,397	<i>1,183</i>	1,247	1,391	1,398	1,414	1,393	1,372	1,390	1,488	1,516	1,541	1,534
Indiana.....	1,501	<i>1,493</i>	1,509	1,565	1,540	<i>1,408</i>	1,455	1,416	1,409	1,493	1,517	1,552	1,661
Maine.....	8,647	8,820	8,748	8,813	8,606	8,681	8,802	8,589	8,397	<i>8,534</i>	8,552	8,582	8,941
Maryland.....	1,249	<i>1,168</i>	1,269	1,270	1,255	1,276	1,217	1,231	1,235	1,270	1,243	1,290	1,272
Massachusetts.....	12,848	12,614	12,735	12,759	12,673	12,825	12,843	<i>12,611</i>	12,791	12,907	13,080	13,100	15,234
Michigan.....	4,327	<i>4,170</i>	4,213	<i>4,168</i>	4,238	4,374	4,480	4,393	4,444	4,460	4,365	4,356	4,261
Minnesota.....	607	<i>541</i>	588	612	629	634	638	614	546	616	619	625	618
New Hampshire.....	3,413	3,368	3,374	3,413	3,460	3,487	3,471	3,338	<i>3,855</i>	3,370	3,618	3,366	3,431
New Jersey.....	2,223	<i>2,100</i>	2,118	2,104	2,146	2,217	2,227	2,244	2,265	2,277	2,298	2,344	2,342
New York.....	12,073	12,298	12,750	12,780	12,337	12,788	12,451	11,855	<i>11,433</i>	11,450	11,618	11,506	11,558
North Carolina.....	825	<i>875</i>	937	829	800	809	804	813	<i>759</i>	832	840	793	809
Ohio.....	4,673	4,687	4,660	4,651	4,657	<i>4,528</i>	4,625	4,596	4,605	4,711	4,766	4,779	4,811
Oregon.....	988	<i>939</i>	937	937	1,139	<i>1,175</i>	1,035	885	836	<i>834</i>	877	1,122	1,144
Pennsylvania.....	6,656	6,577	<i>6,481</i>	6,554	6,549	6,716	6,696	6,586	6,577	6,683	6,697	6,916	6,838
Vermont.....	1,030	<i>1,118</i>	1,117	1,133	1,022	1,077	1,092	940	<i>885</i>	903	993	1,049	1,036
Virginia.....	912	<i>893</i>	900	915	<i>865</i>	865	872	900	897	921	920	968	927
West Virginia.....	1,162	<i>1,057</i>	1,055	1,147	<i>1,050</i>	1,113	1,123	1,218	1,311	1,250	1,178	1,240	1,202
Wisconsin.....	7,467	<i>7,161</i>	7,186	7,286	7,541	7,544	7,651	7,598	7,571	7,445	7,369	7,545	7,716

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

There was comparatively little variation in the number of wage earners from month to month. The largest number employed during any month of 1909 was 77,430, in December, and the smallest number, 74,517, in August, the minimum number being equal to 96.2 per cent of the maximum. In 1904 the maximum number, 67,724, was shown for October, and the minimum number, 63,284, for February, the latter number being equal to 93.4 per cent of the former.

In New York the greatest number of wage earners were employed in May, but in four of the eight leading states (Massachusetts, Maine, Wisconsin, and Ohio) the month of maximum employment was December. The months of maximum and minimum employment for 1909, and the number of wage earners reported for both months, are given for a larger number of states in Table 26.

Prevailing hours of labor.—In Table 8 the wage earners in the industry as a whole have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Nearly three-fourths (71.4 per cent) of the wage earners employed in the industry as a whole in 1909 were in mills where the prevailing hours were 60 or more per week.

Of the seven groups shown in the table, the largest was that made up of the wage earners in establishments where the prevailing hours were 60 per week, such wage earners constituting 30.2 per cent of the total number, and the second largest group was made

up of those working 72 hours or over per week, which group formed 21.7 per cent of the total. The group working 60 hours per week was the most important in 7 of the 20 states for which figures are given. In Connecticut, Delaware, Maryland, Minnesota, and Oregon the most common working time was more than 60 but less than 72 hours per week, while in Illinois, Indiana, New Jersey, New York, and North Carolina it was 72 hours and over.

Table 8

AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States	75,978	5,595	6,063	3,448	6,582	22,941	14,882	16,457
Connecticut.....	1,720	.....	.....	229	112	542	567	270
Delaware.....	546	.....	.....	.....	.....	.....	286	260
Illinois.....	1,397	.....	.....	.....	189	446	138	624
Indiana.....	1,501	.....	.....	.....	.....	263	141	1,097
Maine.....	8,647	1,011	2,775	1,902	236	841	867	1,125
Maryland.....	1,249	.....	.....	.....	.....	83	1,103	63
Massachusetts.....	12,848	944	386	848	3,697	4,023	2,425	525
Michigan.....	4,327	.....	.....	.....	225	2,534	1,084	484
Minnesota.....	607	.....	.....	.....	.....	77	448	82
New Hampshire.....	3,413	1,282	508	.....	446	651	244	282
New Jersey.....	2,223	12	.....	.....	394	194	726	897
New York.....	12,073	1,295	1,979	279	502	2,656	2,563	2,799
North Carolina.....	825	.....	.....	.....	.....	.....	.....	825
Ohio.....	4,673	.....	.....	.....	468	1,498	1,233	1,474
Oregon.....	988	.....	.....	.....	.....	347	641	.....
Pennsylvania.....	6,656	122	.....	100	188	3,643	91	2,532
Vermont.....	1,030	268	415	.....	35	203	51	58
Virginia.....	912	.....	.....	.....	63	655	.....	194
West Virginia.....	1,162	.....	.....	.....	57	680	329	96
Wisconsin.....	7,467	661	.....	.....	.....	3,195	1,442	2,169

Character of ownership.—Table 9 presents statistics with respect to the character of ownership of the paper and wood pulp mills in the United States.

In 1909, of the total number of mills, 81.5 per cent were under corporate ownership, as compared with 77.1 per cent in 1904. In 1909 the value of products

of these establishments represented 92.8 per cent of the total and in 1904, 89.9 per cent.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	777	781	\$267,858,864	\$188,715,188
Individual.....	71	88	5,990,893	5,519,842
Firm.....	70	88	11,657,927	13,529,652
Corporation.....	633	587	248,435,331	169,665,695
Other.....	3		1,572,813	
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	9.1	11.3	2.2	2.9
Firm.....	9.0	11.6	4.4	7.2
Corporation.....	81.5	77.1	92.8	89.9
Other.....	0.4		0.6	

Table 10 gives statistics for establishments classified according to form of ownership for the 18 states employing an average of more than 500 wage earners in 1909 for which figures can be shown without disclosing individual operations. The three establishments under "other" forms of ownership have in this table been included with those under corporate ownership.

In 1909, 1,912 wage earners, or 2.5 per cent of the total, were employed in establishments under individual ownership; 3,524, or 4.6 per cent, in those under firm ownership; and 70,542, or 92.8 per cent, in those owned by corporations (including those under "other" ownership).

STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	71	70	638	1,912	3,524	70,542	\$5,990,893	\$11,857,927	\$250,008,144	\$3,443,407	\$5,058,707	\$83,712,509
Connecticut.....	9	6	36	188	161	1,371	405,647	491,366	4,630,321	172,179	238,539	1,813,200
Delaware.....		2	4		(X)	546		(X)	2,291,728		(X)	704,555
Illinois.....		1	18		(X)	1,597		(X)	4,933,075		(X)	1,835,635
Indiana.....	1	2	24	(X)	58	1,443	(X)	155,267	5,047,063	(X)	61,101	1,644,084
Maine.....	2	5	38	(X)	1,408	7,239	(X)	4,839,434	29,110,796	(X)	2,060,219	11,385,798
Maryland.....	3	3	7	8	52	1,189	16,347	62,028	4,816,026	6,967	12,364	1,596,648
Massachusetts.....	4	8	76	(X)	1,496	11,352	(X)	5,253,889	34,836,824	(X)	3,397,099	14,350,001
Michigan.....	3	1	28	48	(X)	4,279	107,721	(X)	13,814,403	47,391	(X)	4,849,638
Minnesota.....			9			607			2,385,026			947,250
New Hampshire.....	1	5	28	(X)	92	3,321	(X)	408,620	13,585,631	(X)	173,086	4,567,796
New Jersey.....	3	3	31	56	84	2,083	157,862	266,798	7,129,768	63,931	88,821	2,632,925
New York.....	21	16	141	273	280	11,520	957,261	975,251	46,927,098	371,027	376,378	16,344,922
Ohio.....	1	1	45	(X)	(X)	4,673	(X)	(X)	16,965,260	(X)	(X)	6,066,976
Pennsylvania.....	19	5	38	373	363	5,920	895,018	1,166,905	17,810,794	416,917	458,211	7,599,278
Vermont.....	1	8	16	(X)	152	878	(X)	559,144	3,342,490	(X)	190,085	1,256,194
Virginia.....	1		8	(X)		912	(X)		3,666,745	(X)		1,508,373
West Virginia.....		1	8		(X)	1,162		(X)	2,662,037		(X)	968,618
Wisconsin.....	1		56	(X)		7,467	(X)		25,962,099	(X)		9,289,534

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases, an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for corporations include those for the few comparatively unimportant establishments operated by cooperative associations or under other miscellaneous forms of ownership.

ESTABLISHMENTS CLASSIFIED ACCORDING TO SIZE.

Classification by value of products.—Table 11 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total	777	781	\$267,858,984	\$188,715,189
Less than \$5,000.....	20	23	64,416	74,086
\$5,000 and less than \$20,000.....	57	59	719,516	749,259
\$20,000 and less than \$100,000.....	203	254	11,354,011	14,204,394
\$100,000 and less than \$1,000,000.....	447	395	161,938,623	126,385,745
\$1,000,000 and over.....	50	30	93,580,398	47,301,705
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	2.6	3.0	(¹)	(¹)
\$5,000 and less than \$20,000.....	7.3	7.8	0.3	0.4
\$20,000 and less than \$100,000.....	28.1	33.4	4.2	7.5
\$100,000 and less than \$1,000,000.....	57.5	51.9	60.5	67.0
\$1,000,000 and over.....	6.4	3.9	35.0	25.1

¹ Less than one-tenth of 1 per cent.

In 1909, 6.4 per cent of the establishments manufactured products valued at \$1,000,000 or over, as against

3.9 per cent in 1904. While such establishments represented a comparatively small proportion of the total number at both censuses, they reported 35 per cent of the total value of products in 1909 and 25.1 per cent in 1904. Establishments manufacturing products valued at \$100,000 but less than \$1,000,000 were the most important class, forming 57.5 per cent of the total number and reporting 60.5 per cent of the total value of products in 1909, although the latter percentage is somewhat smaller than the corresponding percentage for 1904.

The average value of products per establishment increased from \$247,983 in 1904 to \$344,475 in 1909, and the average value added by manufacture, as computed from the figures in Table 2, from \$101,792 to \$131,550. The average number of wage earners per establishment shows an increase from 86.7 in 1904 to 97.8 in 1909.

Classification by number of wage earners.—Table 12 classifies the establishments in the 21 leading states according to the number of wage earners employed.

Table 12

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—																
	Es-tab-lish-ments.	Wage earners (average number).	No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
			Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.....	777	75,878	.....	36	112	157	2,119	186	6,567	156	11,262	168	27,473	49	18,457	16	10,906	1	1,062
Connecticut.....	51	1,720	.....	6	23	19	254	19	701	4	324	3	418	.....	.....	.....	.....	.....	.....
Delaware.....	6	546	.....	.....	.....	2	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois.....	19	1,397	.....	1	5	4	56	6	229	4	302	3	529	1	276	.....	.....	.....	.....
Indiana.....	27	1,501	.....	.....	.....	3	54	10	298	11	790	3	359	.....	.....	.....	.....	.....	.....
Maine.....	45	8,647	.....	1	2	5	56	11	382	7	576	10	1,794	6	2,058	4	2,717	1	1,062
Maryland.....	13	1,249	.....	3	8	3	34	4	134	.....	.....	2	340	.....	.....	1	733	.....	.....
Massachusetts.....	88	12,848	.....	2	9	12	158	12	390	11	867	37	6,379	12	3,662	2	1,383	.....	.....
Michigan.....	32	4,327	.....	.....	.....	5	58	7	240	4	264	14	2,654	1	347	1	764	.....	.....
Minnesota.....	9	607	.....	.....	.....	2	29	2	54	3	205	2	319	.....	.....	.....	.....	.....	.....
New Hampshire.....	34	3,413	.....	.....	.....	13	177	9	260	2	117	5	674	4	1,498	1	687	.....	.....
New Jersey.....	37	2,223	.....	1	5	7	92	11	382	11	690	6	748	1	306	.....	.....	.....	.....
New York.....	178	12,073	.....	11	28	44	587	52	1,709	38	2,808	24	3,884	8	2,556	1	501	.....	.....
North Carolina.....	3	825	.....	.....	.....	1	7	.....	.....	.....	.....	1	122	.....	.....	1	696	.....	.....
Ohio.....	47	4,673	.....	.....	.....	5	88	15	496	14	955	11	1,695	1	439	1	1,000	.....	.....
Oregon.....	5	988	.....	.....	.....	1	18	.....	.....	.....	.....	2	347	.....	.....	1	527	.....	.....
Pennsylvania.....	62	6,656	.....	9	25	15	201	10	359	8	580	13	2,374	5	1,802	2	1,315	.....	.....
Vermont.....	25	1,030	.....	1	5	9	122	9	294	5	292	.....	.....	1	317	.....	.....	.....	.....
Virginia.....	9	912	.....	1	2	1	12	.....	.....	.....	.....	2	242	1	381	.....	.....	.....	.....
Washington.....	2	556	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	175	1	381	.....	.....	.....	.....
West Virginia.....	9	1,162	.....	.....	.....	.....	.....	.....	139	2	111	2	329	.....	.....	1	583	.....	.....
Wisconsin.....	57	7,467	.....	.....	.....	3	39	4	316	18	1,298	20	3,380	7	2,434	.....	.....	.....	.....

Of the 777 establishments reported in 1909, 4.6 per cent employed from 1 to 5 wage earners each, 20.2 per cent from 6 to 20, 25.2 per cent from 21 to 50, 20.1 per cent from 51 to 100, and 21.4 per cent from 101 to 250. There were only 66 establishments that employed more than 250 wage earners. Of these, 17 employed over 500. More than a third of the wage earners, however, worked in mills employing over 250 each.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$237,310,150, distributed as follows: Cost of materials, \$165,442,341, or 69.7 per cent; wages, \$40,804,502, or 17.2 per cent; salaries, \$9,510,141, or 4 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$21,553,166, or 9.1 per cent. These proportions, as may be seen by comparing the items in Table 26, vary somewhat in the several states.

ENGINES, POWER, AND FUEL.

Engines and power.—The amount of power used in the paper and wood pulp industry was first reported at the census of 1869. Table 2 shows that the total amount of power used increased from 54,287 horsepower in 1869 to 1,304,265 in 1909. Table 13 shows

statistics of power as reported at the censuses of 1909, 1904, and 1899.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	6,990	5,701	5,238	1,304,265	1,093,708	762,118	100.0	100.0	100.0
Owned.....	6,229	5,661	5,238	1,264,185	1,090,757	761,858	96.9	99.7	100.0
Steam.....	2,705	2,487	2,016	469,089	370,852	255,854	36.0	33.9	33.6
Gas.....	46	24	13	6,675	1,916	1,062	0.5	0.2	0.1
Water wheels.....	3,470	3,149	3,209	785,961	717,979	504,762	60.3	65.6	66.2
Water motors.....	8	1	(¹)	2,185	10	(¹)	0.2	(²)	(²)
Other.....	.....	.....	.....	275	.....	180	(²)	(²)	(²)
Rented.....	761	40	(¹)	40,080	2,951	260	3.1	0.3	(²)
Electric.....	761	40	(¹)	38,610	2,748	85	3.0	0.3	(²)
Other.....	.....	.....	.....	1,470	203	175	0.1	(²)	(²)
Electric motors.....	2,943	574	91	130,120	31,804	2,814	100.0	100.0	100.0
Run by current generated by establishment.....	2,202	534	91	91,510	28,856	2,729	70.3	91.3	97.0
Run by rented power.....	761	40	(¹)	38,610	2,748	85	29.7	8.7	3.0

¹ Not reported.

² Less than one-tenth of 1 per cent.

The total primary power used in the paper and wood pulp mills increased from 762,118 horsepower in 1899 to 1,304,265 horsepower in 1909, or 71.1 per cent. Water wheels still supply the greater part of the power used in the manufacture of paper and wood pulp, although such power represented a smaller proportion of the total primary power in 1909 than in 1904. Some part of this decrease is due to the great increase in rented electric power, much of which represents water power transformed into electrical energy. There was also an increase in the relative importance of both steam engines and gas and other internal-combustion

engines. The number and horsepower of electric motors used for distributing power by means of current generated in the establishment show a great increase.

Table 14 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in 20 of the leading states.

STATE.	Number of establishments reporting.	Total horsepower.	PRIMARY HORSEPOWER.					ELECTRIC HORSEPOWER.		FUEL USED.							
			Owned by establishments reporting.				Rented.		Total rented and generated by establishment.	Generated in the establishment reporting.	Coal.						
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.			Other.	Anthracite (long tons).	Bituminous (short tons).	Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
United States	777	1,304,265	1,264,185	469,089	6,675	788,148	275	38,810	1,470	130,120	81,510	558,677	5,480,314	500	226,001	584,538	6,435,293
Connecticut	51	19,509	19,454	11,449	8,005	641		55		255	200	23,184	92,807		84	97	540
Delaware	6	4,318	4,318	3,677									60,334				
Illinois	19	15,169	15,165	11,185	14	3,966		4		1,925	1,921		223,676				700
Indiana	27	18,382	17,985	14,930	1,050	1,105		1,297		2,695	1,398	2	285,274			2,535	18,482
Maine	45	223,787	215,985	48,271	30	167,684		7,572	230	22,395	14,823	15,202	590,101		41,099		
Maryland	13	11,407	11,162	10,251		911		10	235	6,413	6,403		132,467				354,808
Massachusetts	88	115,792	113,133	59,727	285	53,121		2,004	655	6,241	4,237	69,131	465,347		4,789	19	
Michigan	32	48,700	47,530	31,900		15,630		1,170		4,232	3,082		385,344		11,298		47
Minnesota	9	23,440	22,940	2,310		20,630		500		1,258	758		35,360		8,880		
New Hampshire	34	79,912	74,747	19,603		55,144		5,165		13,963	8,798	8,133	186,189		73,847	42	
New Jersey	37	22,996	22,816	19,338	500	2,978		180		1,036	856	167,046	79,431				52
New York	178	337,548	323,962	66,196	65	257,701		13,586		28,149	14,563	178,387	872,378		2,775	176	
North Carolina	3	9,650	9,650	6,800		2,850				8,000	8,000		125,600				
Ohio	47	51,402	50,398	43,815	2,600	3,708	275	1,004		9,778	8,772		492,136				4,581,706
Oregon	5	39,651	39,651	5,857	5	33,789				1,270	1,270					228,562	
Pennsylvania	82	66,910	64,493	58,155	25	6,313		2,417		10,982	8,565	98,456	733,072		15,855	2,188	58,259
Vermont	25	38,191	38,161	3,376		34,785		30		232	202	4,136	51,642		4,711		
Virginia	9	9,770	9,770	4,610		5,260				50	50		111,287		200		
West Virginia	9	11,025	10,760	5,910	650	4,200		265		695	430		49,442				1,392,867
Wisconsin	57	136,903	135,683	30,214	1,429	104,040		870	350	5,603	4,733		432,234		37,678	4,756	
All other states	21	19,803	17,322	11,615	22	5,685		2,481		4,950	2,469		56,193	500	24,825	346,109	77,894

In 1909 New York, Maine, Wisconsin, and Massachusetts together reported 814,030 horsepower, or 62.4 per cent of the aggregate for the industry. Steam power was the most important form of power in 12 of the states shown separately, and water power in 8. New York reported a larger amount of steam, water, and electric power than any other state, while Ohio reported the largest amount of power developed by gas and other internal combustion engines.

Fuel consumed.—Owing to the extensive use of water power in the paper and wood pulp industry, less fuel is consumed in generating power than would otherwise be required. Bituminous coal was the principal class of fuel used in 1909. The largest amount was reported by New York, which state also used the largest amount of anthracite coal. Of the total amount of gas used, 70.6 per cent was reported for Ohio.

SPECIAL DATA RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

MATERIALS.

Summary for the United States.—Table 15 shows statistics of the materials used in the industry for 1909, 1904, and 1899.

The total cost of materials reported by establishments engaged in the manufacture of paper and wood pulp in 1909 was \$165,442,341, as compared with \$111,251,478 in 1904, and \$70,530,236 in 1899, an increase during the decade of 134.6 per cent. These totals involve much duplication due to the use of the products of one establishment, especially pulp, as material for another. Substantial gains were made during the decade 1899–1909 in the quantities of the various materials used, with the exception of "other chemical fiber" and straw. The relative gains in quantity, however, were not as great as those in cost.

Of the total cost of materials used in 1909, that of pulp wood represented 20.4 per cent; that of wood pulp purchased, 26.5 per cent; that of rags, including cotton and flax waste and sweepings, 6.5 per cent; that of old or waste paper, 8.3 per cent; and that of manila stock, straw, and all other materials, including fuel, mill supplies, etc., 38.3 per cent. The corresponding proportions in 1899 were as follows: Pulp wood, 13.9 per cent; wood pulp purchased, 26 per cent; rags, etc., 9.4 per cent; old or waste paper, 6.9 per cent; manila stock, straw, and all other materials, 43.8 per cent. The large amount included under "all other materials" represents the cost of chemicals, clay, sizing, fuel, rent of power, mill supplies, etc. The cost of fuel and rent of power, in 1909, as shown by Table 27, was \$18,320,266, this item representing 11.1 per cent of the total cost of materials.

MATERIAL.	1909	1904	1899
Total cost.....	\$165,442,341	\$111,251,478	\$70,530,236
Pulp wood.....	\$33,772,475	\$20,800,871	\$9,837,516
Wood pulp, purchased:			
Tons.....	1,241,914	877,702	644,006
Cost.....	\$43,861,357	\$27,633,164	\$18,369,464
Ground—			
Tons.....	452,849	317,286	261,962
Cost.....	\$9,487,508	\$5,754,259	\$4,361,211
Soda fiber—			
Tons.....	154,626	120,978	94,042
Cost.....	\$6,862,864	\$5,047,105	\$3,430,809
Sulphite fiber—			
Tons.....	626,029	433,160	273,194
Cost.....	\$27,184,726	\$16,567,122	\$10,112,189
Other chemical fiber—			
Tons.....	8,410	6,278	14,808
Cost.....	\$326,259	\$264,078	\$465,255
Rags, including cotton and flax waste and sweepings:			
Tons.....	357,470	294,552	234,514
Cost.....	\$10,721,559	\$8,864,607	\$6,595,427
Old or waste paper:			
Tons.....	983,882	588,543	356,193
Cost.....	\$13,691,120	\$7,430,335	\$4,869,409
Manila stock, including jute bagging, rope, waste, threads, etc.:			
Tons.....	117,080	107,029	99,301
Cost.....	\$3,560,033	\$2,502,332	\$2,437,256
Straw:			
Tons.....	303,137	304,585	367,305
Cost.....	\$1,460,282	\$1,502,886	\$1,395,659
All other materials.....	\$58,375,515	\$42,517,283	\$27,025,505

Pulp wood used.—Unlike the schedules used in 1904 and 1899, the schedule used in collecting data at the census of 1909 did not provide for reporting the kind or quantity of pulp wood used in the manufacture of pulp. Such data for 1909 were collected, however, by the Census Bureau in collaboration with the Forest Service of the Department of Agriculture, and the figures secured are shown in Table 16 in comparison with the census figures for 1904 and 1899.

KIND.	WOOD CONSUMED IN THE MANUFACTURE OF WOOD PULP (CORDS).				
	1909 ¹	1904	1899	Per cent of increase. ²	
				1904-1909	1899-1904
Total.....	4,001,607	3,050,717	1,988,310	31.2	53.6
Spruce, domestic.....	1,653,249	1,732,531	1,160,118	-4.6	49.3
Spruce, imported.....	763,332	538,305	349,084	42.7	54.2
Poplar, domestic.....	303,376	213,058	236,820	42.2	-10.0
Poplar, imported.....	25,622	35,313	20,133	-27.4	75.4
Hemlock, domestic.....	559,657	(C)	(C)		
All other wood.....	691,371	531,510	220,155	30.2	141.4

¹ The figures represent the wood used by all mills manufacturing wood pulp, which includes a few where it was not the primary product.

² A minus sign (-) denotes decrease.

³ Included with "all other wood."

Up to 1899 native spruce and poplar were used almost exclusively for pulp wood. Since that time, however, the advancing price of the native stock has led to the increased importation of these woods from Canada and to the use of other and cheaper native woods.

Table 17 shows the cost of the pulp wood used in the manufacture of wood pulp during 1909, 1904, and 1899 in each of the five leading states in the industry.

New York reported the largest absolute increase of any of the states in expenditures for pulp wood from 1899 to 1909, with Maine second, while Maine shows the highest relative increase, with Wisconsin second.

STATE.	COST OF WOOD USED IN THE MANUFACTURE OF WOOD PULP.		
	1909	1904	1899
United States.....	\$33,772,475	\$20,800,871	\$9,837,516
New York.....	9,667,765	6,530,006	3,208,522
Maine.....	7,984,338	4,838,375	1,718,091
Wisconsin.....	4,325,839	2,502,892	1,136,051
New Hampshire.....	3,222,871	2,011,363	1,157,960
Pennsylvania.....	2,111,025	1,222,491	711,450
All other states.....	6,460,637	3,695,744	1,905,442

Wood pulp used.—Table 18 shows the quantity of the different kinds of wood pulp used, both domestic and imported, during the years 1909, 1904, and 1899.

KIND.	WOOD PULP USED (TONS).		
	Total.	Produced by establishments using.	Purchased.
Total:			
1909.....	2,826,591	1,584,677	1,241,914
1904.....	2,018,764	1,141,062	877,702
1899.....	1,172,880	628,874	644,006
Ground:			
1909, total.....	1,321,368	868,519	452,849
Domestic.....	1,201,832	868,519	333,313
Imported.....	119,536		119,536
1904, total.....	1,012,862	695,576	317,286
1899, total.....	568,284	306,322	261,962
Soda fiber:			
1909, total.....	297,408	142,782	154,626
Domestic.....	287,945	142,782	145,163
Imported.....	9,463		9,463
1904, total.....	187,382	66,404	120,978
1899, total.....	172,142	78,100	94,042
Sulphite fiber:			
1909, total.....	1,199,405	573,376	626,029
Domestic.....	1,027,012	573,376	453,638
Imported.....	172,393		172,393
1904, total.....	812,242	379,082	433,160
1899, total.....	417,646	144,452	273,194
Other chemical fiber, domestic:			
1909.....	8,410		8,410
1904.....	6,278		6,278
1899.....	14,808		14,808

The total quantity of wood pulp used in the paper mills in 1909 was 2,826,591 tons, as compared with 1,172,880 tons in 1899, an increase during the 10-year period of 1,653,711 tons, or 141 per cent. Of the total quantity of wood pulp used, 56.1 per cent was produced in 1909 by the establishments in which it was used, as compared with 45.1 per cent in 1899. During the decade 1899-1909 the quantity of ground wood pulp used increased 753,084 tons, or 132.5 per cent; that of soda fiber increased 125,266 tons, or 72.8 per cent; and that of sulphite fiber, 781,759 tons, or 187.2 per cent. There was, however, a decrease of 6,398 tons, or 43.2 per cent, in the quantity of other chemical fiber. Of the entire quantity of wood pulp used in 1909, sulphite fiber constituted 42.4 per cent, as compared with 35.6 per cent in 1899, this being the only one of the four classes of fiber for which a larger proportion is shown for 1909. The proportion of the total quantity of wood pulp used which was represented by ground wood decreased from 48.5 per cent in 1899 to 46.7 per cent in 1909; the proportion represented by soda fiber from 14.7 per cent to 10.5 per cent; and that represented by other chemical fiber from 1.3 per cent to three-tenths of 1 per cent.

These totals involve considerable duplication due to the sale of pulp to other establishments in the industry, but the duplication was of about equal relative amount at each census.

Of the 4,216,708 tons of paper of all kinds manufactured during the year 1909, 1,175,554 tons, or 27.9 per cent, was news paper. Book paper (including coated, plate, and cover) formed 16.5 per cent; cardboard, 1.2 per cent; fine paper, 4.7 per cent; wrapping paper, 18.1 per cent; boards, 19.7 per cent; tissue paper, 1.8 per cent; blotting paper, two-tenths of 1 per cent; building (roofing, asbestos, and sheathing) paper, 5.4 per cent; hanging papers, 2.2 per cent; and miscellaneous paper products, 2.3 per cent. The corresponding proportions of the 2,167,593 tons of all kinds of paper produced in 1899 were as follows: News paper, 26.3 per cent; book paper, 14.9 per cent; cardboard, 1.3 per cent; fine paper, 5.2 per cent; wrapping paper, 24.7 per cent; boards, 16.9 per cent; tissues, 1.3 per cent; blotting paper, two-tenths of 1 per cent; building paper, 4.5 per cent; hanging papers, 2.5 per cent; and miscellaneous paper products, 2.3 per cent.

The total amount of wood pulp made for sale or for use in establishments other than where produced for 1909 was 910,846 tons, as compared with 780,706 tons in 1904 and 650,651 tons in 1899, an increase of 260,195 tons, or 40 per cent, during the decade. Of the total quantity of wood pulp produced in 1909, ground wood formed 34.1 per cent; soda fiber, 17.1 per cent; and sulphite fiber, 48.8 per cent, as compared with 43 per cent, 15.2 per cent, and 41.7 per cent, respectively, in 1899. Both soda and sulphite fiber show large increases for the decade 1899-1909, but ground wood pulp shows only a small increase.

The quantity of wood pulp produced in all mills in the industry in 1909 was 2,495,523 tons, as compared with 1,921,768 tons in 1904 and 1,179,525 tons in 1899, thus showing an increase during the decade of 1,315,998 tons, or 111.6 per cent. Of the total quantity of wood pulp produced in 1909, including that made for sale or for use in establishments other than that in which it was produced and that used in the establishments where produced, ground wood formed 47.3 per cent; soda fiber, 12 per cent; and sulphite fiber, 40.8 per cent, as compared with 49.7 per cent, 15 per cent, and 35.3 per cent, respectively, in 1899. The output of sulphite fiber increased 144.6 per cent during the decade, that of ground wood pulp 101.1 per cent, and that of soda fiber 68.6 per cent. A larger proportion of the wood pulp produced in 1909 was used in the establishments where produced than was the case in 1899. This is shown by the fact that

the proportion of each of the three kinds of fiber manufactured for sale or for use in establishments other than where produced was smaller in 1909 than at the census 10 years earlier.

Table 21 shows the actual amount of increase and the percentage of increase for both the quantity and value of the principal products of the paper mills during the decade from 1899 to 1909.

PRODUCT.	INCREASE: 1899-1909			
	Amount.		Per cent.	
	Quantity (tons).	Value.	Quantity.	Value.
News paper, total.....	606,342	\$26,763,686	106.5	133.3
In rolls.....	636,445	27,052,072	140.0	171.7
In sheets.....	-30,103	-288,386	-26.3	-6.7
Book paper, plain.....	293,523	23,379,870	104.1	120.1
Cardboard, bristol board, card middles, tickets, etc.....	22,955	1,632,338	80.6	94.9
Fine paper:				
Writing.....	78,921	12,743,232	87.5	104.3
All other.....	6,585	437,432	29.3	11.9
Wrapping paper:				
Bogus or wood manila, all grades.....	164,106	10,629,030	80.5	116.2
Heavy (mill wrappers, etc.).....	25,686	237,554	31.0	5.7
Manila (rope, jute, tag, etc.).....	-15,688	1,059,672	-17.5	17.9
Boards:				
Wood pulp.....	26,849	1,233,366	60.8	87.7
Straw.....	14,255	563,509	9.0	17.7
News.....	42,487	1,284,938	132.3	138.1
Tissues.....	49,339	5,067,002	173.7	145.3
Blotting paper.....	5,226	605,430	120.1	104.2
Building (roofing, asbestos, and sheathing) paper.....	128,909	6,225,401	133.0	205.7
Hanging papers.....	37,828	2,166,169	69.6	95.6

¹ A minus sign (-) denotes decrease.

Actual increases are shown in the quantities of all of the different varieties of paper for which separate totals are given in Table 21, with the exception of news paper in sheets and manila wrapping paper. Both news paper in sheets and manila wrapping paper, however, show an increased value per ton in 1909 over that shown for 1899. Of the several products the largest actual increase, amounting to 636,445 tons, is shown for the production of news paper in rolls. The quantity and value of the news paper in sheets show an actual decrease. Next to news paper in rolls the largest amount of increase in value is shown for book paper. All but four of the classes of paper listed in the table show a larger relative increase in value than in quantity, the exceptions being "all other" fine paper, heavy wrapping paper, tissues, and blotting paper.

Products, by states.—Table 22 shows, by states, the quantities and values of the different kinds of products of paper and wood pulp mills in 1909, and the quantities produced in 1904 and 1899. This table also shows, by states, the total quantity of the different kinds of wood pulp produced, including that used in the mills where manufactured, in 1909, 1904, and 1899.

Equipment.—Table 23 shows the number and capacity of the different paper machines and the different types of pulp equipment reported for the industry in 1909, 1904, and 1899.

EQUIPMENT.	1909	1904	1899
Paper machines:			
Total number.....	1,480	1,369	1,232
Capacity, yearly, tons.....	5,293,397	3,857,903	2,782,219
Fourdrinier—			
Number.....	804	752	663
Capacity per 24 hours, tons.....	10,508	8,569	(1)
Cylinder—			
Number.....	676	617	569
Capacity per 24 hours, tons.....	6,316	4,740	(1)
Pulp equipment:			
Grinders, number.....	1,435	1,362	1,168
Digesters, total number.....	542	517	426
Sulphite fiber, number.....	348	309	(2)
Soda fiber, number.....	194	208	(2)
Capacity, yearly, tons of pulp.....	3,405,621	2,644,753	1,536,431
Ground, tons.....	1,809,685	1,515,088	(2)
Sulphite, tons.....	1,250,983	885,092	(2)
Soda, tons.....	344,953	244,573	(2)

¹ Not reported.

² Not reported separately.

Paper machines.—The number of Fourdrinier machines increased 21.3 per cent, and the number of cylinder machines 18.8 per cent, during the decade, while their combined yearly capacity increased 2,511,178 tons, or 90.3 per cent. The total capacity of the

Fourdrinier machines per 24 hours in 1909 was 10,508 tons, or an average of 13.1 tons per machine, as compared with 8,569 tons, or 11.4 tons per machine, in 1904. The total capacity of the cylinder machines in 1909 was 6,316 tons, or an average of 9.3 tons per machine, as compared with 4,740 tons, or 7.7 tons per machine, in 1904. The capacity of the machines was not reported in 1899.

Pulp-mill equipment.—The total capacity of the pulp mills increased 121.7 per cent during the decade 1899 to 1909 and 28.8 per cent during the five-year period 1904–1909. The capacity of the apparatus for manufacturing the three classes of pulp was not reported for 1899, but during the period 1904–1909 the capacity increased as follows: Grinders, 19.4 per cent; sulphite digesters, 41.3 per cent; and soda digesters, 41 per cent.

Imports and exports.—Table 24 shows the imports of paper, paper stock, and wood pulp, and the exports of paper and wood pulp, in the different years from 1899 to 1909 as reported by the Bureau of Foreign and Domestic Commerce of the Department of Commerce.

YEAR ENDING JUNE 30—	IMPORTS.				EXPORTS.			YEAR ENDING JUNE 30—	IMPORTS.				EXPORTS.		
	Paper (value).	Paper stock (value).	Wood pulp.		Paper (value).	Wood pulp.			Paper (value).	Paper stock (value).	Wood pulp.		Paper (value).	Wood pulp.	
			Quantity (long tons).	Value.		Quantity (long tons).	Value.				Quantity (long tons).	Value.		Quantity (long tons).	Value.
1909.....	\$11,632,571	\$3,638,034	274,217	\$8,629,263	\$7,663,139	9,219	\$448,960	1903.....	\$4,733,036	\$3,015,084	116,881	\$3,387,770	\$7,180,014	10,029	\$445,228
1908.....	12,223,058	3,675,926	237,514	7,313,326	8,064,706	10,645	519,625	1902.....	4,223,125	2,770,255	67,416	2,069,092	7,312,030	17,120	740,103
1907.....	10,727,885	5,580,528	213,110	6,348,857	9,856,733	11,196	498,552	1901.....	4,002,989	2,183,686	46,757	1,586,402	7,438,901	27,468	1,051,867
1906.....	6,995,761	4,374,464	157,224	4,584,942	9,536,065	13,162	587,878	1900.....	3,795,645	3,261,778	82,441	2,405,630	6,215,833	12,748	458,463
1905.....	5,623,638	3,796,595	167,504	4,500,955	8,238,088	10,582	473,585	1899.....	3,191,589	2,614,914	33,319	671,506	5,477,884	24,970	696,319
1904.....	5,319,086	2,900,713	144,796	3,602,668	7,543,728	13,496	593,474								

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the paper and wood pulp industry are presented, by states, in Tables 25 and 26.

Table 25 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the

industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 26 gives more detailed statistics for the industry for 1909 only.

PAPER AND WOOD PULP—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

Table 25	STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.			Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).	
				Total.	Proprietors and firm members.	Salaried employees.								Wage earners (average number).
	United States.....	1809 1904 1899	777 781 763	81,473 70,051 53,013	250 308 431	5,245 3,778 2,836	75,978 65,884 49,646	1,304,285 1,083,708 782,118	\$409,349 277,444 167,508	\$9,510 6,087 4,501	\$40,805 32,018 20,746	\$185,442 111,251 70,530	\$287,657 183,715 127,328	\$102,215 77,464 58,786
	California.....	1909 1904 1899	4 3	340 273	2 2	26 12	312 259	7,163 3,808	2,068 1,176	36 20	207 181	440 274	969 640	529 366
	Connecticut.....	1909 1904 1899	51 50 49	1,920 1,933 1,576	24 29 36	176 154 116	1,720 1,750 1,426	19,509 18,021 14,621	7,195 5,893 3,968	351 236 182	924 843 633	3,303 2,738 1,982	5,627 5,039 3,565	2,224 2,301 1,583
	Delaware.....	1909 1904 1899	6 6 6	599 575 476	4 6 6	49 22 19	546 547 451	4,318 5,115 4,010	3,314 3,176 2,143	61 70 62	310 252 194	1,587 1,270 1,028	2,292 1,905 1,600	705 635 572
	Illinois.....	1909 1904 1899	19 19 15	1,542 1,036 664	3 4 6	142 73 35	1,397 959 623	15,169 12,818 9,551	8,400 3,993 1,555	200 120 37	727 462 250	3,099 1,416 798	4,983 2,443 1,432	1,874 1,027 634
	Indiana.....	1909 1904 1899	27 36 39	1,627 1,737 1,962	7 5 12	119 112 134	1,501 1,620 1,816	18,382 19,775 23,797	7,132 6,511 5,379	173 132 186	754 664 724	3,497 2,517 2,471	5,202 3,917 4,170	1,705 1,400 1,699
	Iowa.....	1909 1904 1899	4 4 4	225 165 193	..... ..... 2	20 13 11	205 152 180	1,435 1,005 1,210	673 368 182	25 12 12	81 66 64	281 131 107	437 253 244	156 122 137
	Kansas.....	1909 1904 1899	3 3 1	109 105	1 6	11 8	97 91	920 1,078	330 132	14 8	46 46	120 78	218 202	98 124
	Maine.....	1909 1904 1899	45 37 35	9,146 7,935 5,121	17 11 12	482 350 258	8,647 7,574 4,851	223,787 152,284 92,330	65,133 41,274 17,473	1,019 605 445	5,267 4,053 2,163	20,504 13,868 7,119	33,950 22,951 13,223	13,446 9,083 6,104
	Maryland.....	1909 1904 1899	13 16 21	1,349 1,074 983	15 19 11	85 47 35	1,249 1,008 937	11,407 7,343 8,503	8,399 6,350 2,721	140 76 59	639 397 326	3,278 2,453 1,731	4,894 3,296 2,590	1,616 843 859
	Massachusetts.....	1909 1904 1899	88 87 93	13,742 12,365 9,606	24 33 35	870 627 510	12,848 11,705 9,061	115,792 104,954 82,200	42,524 41,074 26,693	1,690 1,185 861	6,542 5,588 3,938	22,350 17,947 11,919	40,097 32,012 22,141	17,747 14,065 10,222
	Michigan.....	1909 1904 1899	32 30 27	4,581 3,221 2,130	5 6 9	249 163 107	4,327 3,052 2,014	48,700 31,357 22,856	15,754 8,398 4,506	423 218 143	2,142 1,306 701	9,025 4,581 2,708	13,922 7,341 4,218	4,897 2,760 1,510
	Minnesota.....	1909 1904 1899	9 4 1	640 418	..... ..... 22	33 396	607 396	23,440 7,153	3,235 1,491	64 31	361 234	1,438 677	2,385 1,146	947 469
	New Hampshire.....	1909 1904 1899	34 25 29	3,668 2,674 2,524	13 5 20	242 147 113	3,413 2,522 2,391	79,912 49,794 48,590	27,534 14,041 8,163	485 209 173	2,106 1,315 1,037	9,253 5,328 3,953	13,994 8,930 7,245	4,741 3,602 3,292
	New Jersey.....	1909 1904 1899	37 38 34	2,445 1,773 1,308	11 15 25	211 129 93	2,223 1,629 1,190	22,996 17,336 12,978	10,742 7,123 3,671	456 233 163	1,181 787 553	4,769 3,022 1,715	7,554 5,043 3,195	2,785 2,021 1,480
	New York.....	1909 1904 1899	178 177 179	13,018 13,262 10,001	59 85 129	886 759 604	12,073 12,418 9,268	337,548 390,730 227,767	90,912 56,462 37,349	1,471 1,132 859	6,744 6,402 4,100	31,767 22,806 14,563	48,860 37,751 26,716	17,093 14,945 12,153
	Ohio.....	1909 1904 1899	47 53 51	4,972 4,108 3,399	3 3 19	296 222 196	4,673 3,883 3,184	51,402 36,288 28,517	20,970 14,433 7,873	596 327 278	2,419 1,683 1,118	10,898 6,154 3,769	16,965 10,962 6,544	6,067 4,808 2,775
	Pennsylvania.....	1909 1904 1899	62 65 73	7,196 6,283 5,195	32 53 74	508 324 281	6,656 5,906 4,840	66,910 54,837 41,849	27,747 21,409 16,424	820 518 385	3,303 2,839 1,989	11,398 8,510 6,374	19,873 15,411 12,268	8,475 6,901 5,894
	Vermont.....	1909 1904 1899	25 28 27	1,133 1,399 1,320	22 20 16	81 99 88	1,030 1,280 1,216	38,191 42,952 34,526	8,432 5,629 4,854	141 123 129	594 617 571	2,455 2,540 1,685	3,902 3,831 3,385	1,447 1,291 1,700
	Virginia.....	1909 1904 1899	9 9 7	981 1,058 336	1	68 65 34	912 993 302	9,770 7,800 6,345	5,268 6,517 2,282	153 134 58	412 363 103	2,148 1,789 411	3,657 3,034 850	1,509 1,245 439
	West Virginia.....	1909 1904 1899	9 7 6	1,221 585 305	2 3 2	57 37 22	1,162 545 281	11,025 4,575 4,785	3,603 2,215 926	97 47 26	478 230 98	1,683 760 274	2,652 1,298 528	969 538 254
	Wisconsin.....	1909 1904 1899	57 52 47	7,878 6,627 4,442	1 2 3	410 287 199	7,467 6,338 4,240	136,903 105,940 76,876	33,738 24,409 16,580	731 435 308	3,891 2,988 1,649	16,693 10,692 6,713	25,962 17,844 10,896	9,269 7,152 4,183
	All other states.....	1909 1904 1899	18 12 21	3,141 1,445 1,471	4 2 14	224 106 81	2,913 1,337 1,376	59,586 18,745 20,807	16,246 6,310 4,766	364 226 165	1,677 703 535	5,456 1,700 1,210	9,362 3,466 2,516	3,906 1,766 1,306

¹ Figures can not be shown without disclosing individual operations.

PAPER AND WOOD PULP—DETAILED STATISTICS, BY STATES: 1909.

Table 26	STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.								WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horse-power.			
			Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.		Total.	16 and over.		Under 16.					
						Male.	Female.	Average number.	Maximum month.		Minimum month.	Male.	Female.	Male.		Female.		
	United States...	777	81,473	250	2,048	2,393	804	75,978	De	77,430	Au	74,517	78,672	68,497	9,909	107	159	1,304,285
	California.....	4	340	2	10	11	5	312	De	330	Oc	285	330	324	6			7,163
	Connecticut.....	51	1,920	24	95	51	30	1,720	De	1,861	Ja	1,638	1,868	1,573	232	7	6	19,509
	Delaware.....	6	599	4	14	27	8	546	Mh	567	Je ¹	530	559	479	80			4,318
	Illinois.....	19	1,542	3	50	69	23	1,397	No	1,541	Ja	1,183	1,575	1,552	19	4		15,169
	Indiana.....	27	1,627	7	56	44	19	1,501	De	1,661	My	1,402	1,668	1,577	85	4	2	18,382
	Iowa.....	4	225		12	4	4	205	Mh	243	Jy	134	183	169	14			1,435
	Kansas.....	3	109	1	6	3	2	97	Fe	133	Au	42	106	87	19			920
	Maine.....	45	9,146	17	165	252	65	8,647	De	8,841	Se	8,334	8,892	8,399	477	16		223,787
	Maryland.....	13	1,349	15	31	46	8	1,249	No	1,290	Ja	1,158	1,247	1,091	154	2		11,407
	Massachusetts.....	88	13,742	24	268	401	201	12,848	De	13,234	Jy	12,611	13,313	8,673	4,508	22	110	115,792
	Michigan.....	32	4,581	5	95	120	34	4,327	Je	4,480	Mh	4,168	4,395	3,618	777			48,700
	Minnesota.....	9	640		20	11	2	607	Je	638	Ja	541	618	608	10			23,440
	New Hampshire.....	34	3,668	13	88	139	15	3,413	Oc	3,618	Au	3,255	3,423	3,292	131			79,912
	New Jersey.....	37	2,445	11	81	89	41	2,223	No	2,344	Ja	2,100	2,348	2,148	168	14	18	22,996
	New York.....	178	13,018	59	425	352	109	12,073	My	12,788	Au	11,433	12,531	12,100	431			337,548
	Ohio.....	47	4,972	3	128	108	62	4,673	De	4,811	My	4,528	4,796	4,055	737	3	1	51,402
	Pennsylvania.....	62	7,196	32	167	250	91	6,656	No	6,916	Fe	6,481	6,842	6,064	744	17	17	66,910
	Vermont.....	25	1,133	22	44	24	13	1,030	Mh	1,133	Au	885	1,113	1,035	78			38,191
	Virginia.....	9	981	1	34	28	6	912	Au	997	My ¹	865	935	838	94	3		9,770
	West Virginia.....	9	1,221	2	29	24	4	1,162	Au	1,311	Ap	1,050	1,202	1,155	47			11,025
	Wisconsin.....	57	7,878	1	160	210	40	7,467	De	7,716	Ja	7,161	7,629	6,655	958	13	3	136,903
	All other states ²	18	3,141	4	72	130	22	2,913					3,099	3,005	90	2	2	59,583

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States...	\$409,348,505	\$237,310,150	\$6,268,318	\$3,241,822	\$40,304,502	\$18,320,266	\$147,122,075	\$635,461	\$2,002,079	\$527,915	\$18,387,711	\$267,656,864	\$102,214,823
California.....	2,068,048	757,198	25,840	10,410	206,622	99,432	340,963	2,505	6,554		64,872	969,172	528,777
Connecticut.....	7,194,953	5,085,020	268,589	82,111	923,600	407,218	2,896,198	2,412	31,003	9,314	464,575	5,627,334	2,223,918
Delaware.....	3,313,569	2,027,287	27,186	34,021	309,591	155,160	1,432,013		6,462		62,854	2,291,728	704,555
Illinois.....	8,400,333	4,567,670	118,514	81,299	727,420	320,352	2,779,088	8,080	17,723	3,927	511,267	4,983,075	1,883,635
Indiana.....	7,131,771	4,872,964	118,046	55,161	753,755	408,737	3,088,408	13,153	22,615	24,925	388,164	5,202,330	1,705,185
Iowa.....	673,226	425,661	21,679	2,969	81,234	48,175	232,639		1,798	1,600	35,567	437,388	156,574
Kansas.....	329,513	219,375	10,098	3,712	48,430	13,097	107,309		2,430		36,299	217,982	97,576
Maine.....	65,133,247	29,289,896	650,928	368,018	5,266,656	2,628,561	17,875,652	525,124	282,020	84,873	1,608,066	33,950,230	13,446,017
Maryland.....	8,398,665	4,253,865	63,250	77,076	639,057	236,571	3,041,851		9,974		186,086	4,894,401	1,615,979
Massachusetts.....	42,523,682	34,670,185	1,093,532	596,738	6,541,636	2,331,897	20,017,716	12,195	395,610	280,594	3,400,267	40,096,713	17,747,100
Michigan.....	15,754,419	12,417,132	284,879	137,803	2,141,844	958,147	8,066,448		113,847	46,253	667,911	13,922,124	4,897,529
Minnesota.....	3,234,935	2,028,591	48,983	15,360	360,986	162,937	1,274,839		20,807		144,679	2,385,026	947,250
New Hampshire.....	27,533,569	12,857,734	293,719	191,762	2,105,769	1,019,534	8,233,835	4,457	113,368	921	894,369	13,994,251	4,740,882
New Jersey.....	10,741,820	7,024,916	315,768	140,006	1,181,485	597,233	4,171,518	15,900	35,585		567,421	7,554,428	2,785,677
New York.....	90,911,790	43,775,408	997,937	473,213	6,743,806	3,028,118	28,739,165	38,690	352,660	21,216	3,380,603	48,859,610	17,092,327
Ohio.....	20,969,694	15,515,130	404,240	192,088	2,419,215	1,049,097	9,849,188	4,800	86,867	10,768	1,498,867	16,965,260	6,066,975
Pennsylvania.....	27,746,888	17,494,422	538,035	282,227	3,303,034	1,544,116	9,854,195	2,485	59,591	130	1,910,609	19,872,717	8,474,406
Vermont.....	8,431,703	3,462,582	111,090	29,922	593,752	243,335	2,212,020	2,300	36,324		233,839	3,901,634	1,446,279
Virginia.....	5,267,553	2,969,729	112,430	40,751	412,122	194,063	1,954,309		13,272		242,782	3,656,745	1,508,373
West Virginia.....	3,603,392	2,471,810	81,217	36,046	478,113	204,818	1,478,601		23,392	16,000	173,423	2,652,037	968,618
Wisconsin.....	33,737,744	22,748,558	484,297	248,771	3,891,469	1,616,021	15,076,544	2,060	299,600	23,164	1,106,632	25,962,099	9,269,534
All other states ²	16,248,001	8,377,217	218,064	144,358	1,676,906	1,053,647	4,399,576	1,300	70,577	4,230	808,569	9,360,680	3,907,457

¹ Same number reported for one or more other months.
² All other states embrace: District of Columbia, 1 establishment; Georgia, 1; Louisiana, 1; Missouri, 1; North Carolina, 3; Oregon, 5; Rhode Island, 1; South Carolina, 1; Texas, 2; Washington, 2.

PRINTING AND PUBLISHING

THE PRINTING AND PUBLISHING INDUSTRY.

GENERAL STATISTICS.

SUMMARY FOR THE UNITED STATES.

Summary for the industry: 1909.—According to the census classification the printing and publishing industry is made up of six branches, comprising establishments classified as follows: (1) Establishments whose chief business is book and job printing, book printing and publishing, or book publishing only; (2) establishments whose sole business is music printing, or whose chief business is music printing and publishing, or music publishing only; (3) establishments which are engaged in the printing and publishing, or in the publishing only, of newspapers and periodicals; (4) establishments whose chief business is bookbinding and blank-book making; (5) establishments whose chief business is engraving on steel plates and copper plates and printing from such plates; and (6) establishments whose chief business is lithographing.

The first group is composed of establishments whose chief business is either one or both of the following: (a) the publication of books, whether or not the publishing establishment does its own printing; and (b)

“job” or “contract” printing, of any or every character, including the printing of books and of music; establishments engaged exclusively in the printing of music, however, are included in the second group.

The essential characteristic of establishments in the third branch is the publication of newspapers or periodicals, the question of whether or not a given establishment of this class does its own printing being immaterial. It should be noted that this branch includes every establishment which publishes a newspaper or periodical, regardless of the relative importance of the other departments or branches, if any, of its business.

Because of the overlapping of the different branches of the industry as distinguished in this report, comparisons between them would be in some respects misleading. Hence, certain of the tables do not contain separate figures for the different branches, but only totals for all establishments in all the branches combined.

Table 1 presents a summary of the statistics for the printing and publishing industry as a whole and for each of the six branches for 1909.

Table 1	Total for the industry.	ESTABLISHMENTS ENGAGED PRIMARILY IN—					
		Printing and publishing, book and job.	Printing and publishing, music.	Printing and publishing, newspapers and periodicals.	Bookbinding and blank-book making.	Engraving, steel and copper plate, including plate printing.	Lithographing.
Number of establishments.....	31,445	10,708	178	18,871	1,054	316	318
Persons engaged in the industry.....	388,466	141,937	1,800	196,620	23,698	6,479	17,932
Proprietors and firm members.....	30,424	10,778	162	17,890	1,066	330	198
Salaried employees.....	99,608	22,472	900	70,058	2,694	823	2,661
Wage earners (average number).....	258,434	108,687	738	108,672	19,938	5,326	15,073
Primary horsepower.....	297,763	97,546	365	173,889	10,099	2,732	13,132
Capital.....	\$588,345,708	\$202,662,435	\$3,591,381	\$314,740,917	\$22,935,362	\$7,242,200	\$37,173,413
Expenses.....	619,158,045	212,598,947	4,498,709	336,376,872	27,530,441	7,878,383	30,274,693
Services.....	268,086,431	91,561,755	1,323,653	143,700,525	12,855,649	4,539,966	14,104,883
Salaries.....	103,458,251	25,040,439	884,725	69,298,932	3,179,379	1,152,077	3,902,699
Wages.....	164,628,180	66,521,316	438,928	74,401,593	9,676,270	3,387,889	10,202,184
Materials.....	201,774,590	77,650,547	986,202	97,359,605	11,629,906	2,217,599	11,930,731
Miscellaneous.....	149,297,024	43,386,645	2,188,854	95,316,742	3,044,886	1,120,818	4,239,079
Value of products.....	737,876,087	250,925,934	5,575,903	406,090,122	31,742,416	9,432,479	34,109,233
Value added by manufacture (value of products less cost of materials).....	536,101,497	173,275,387	4,589,701	308,730,517	20,112,510	7,214,880	22,178,502

The total value of products for the industry as a whole, which in 1909 was \$737,876,087, involves considerable duplication, due to the fact that establishments in one branch of the industry frequently do work for establishments in another branch. Moreover, there is duplication within certain of the individual branches of the industry, the book-publishing and job-printing branch being a conspicuous example. Many book publishers do no printing, but hire their work done by job-printing establishments, which are in-

cluded in the same branch of the industry, while other concerns perform the presswork themselves but hire composition done. Again, in the newspaper and periodical branch of the industry, certain concerns which print their own publications also print newspapers or periodicals published by others.

In most industries where there is duplication in the value of products reported there is also extensive duplication in the cost of materials, but the latter form of duplication is relatively unimportant in the print-

ing and publishing industry, as the payments made by establishments grouped therein to other establishments similarly classified are not for materials chiefly, but for contract work. In most industries the subtraction of the cost of materials from the total value of products leaves an amount designated as "value added by manufacture" which is exclusive of all, or practically all, duplication. In the case of the printing and publishing industry, however, this "value added by manufacture" involves very considerable duplication due to contract work done by one establishment for another. The total amount reported as paid for this contract work in 1909 was \$36,384,359. Practically all of this was paid to other establishments in the industry. If this amount be deducted from the total value of products, \$737,876,087, there remains, in round numbers, \$700,000,000, which, with a further slight deduction for duplication due to the sale of products by one establishment to another, would represent approximately the net value of products of the industry.

Similarly, the subtraction of the expenditure for contract work from the item of "value added by manufacture" (\$536,101,497) leaves, in round numbers, \$500,000,000 as the true value added by manufacture, exclusive of duplication.

In the printing and publishing industry the cost of materials constitutes a comparatively small proportion of the total value of products. The combined cost of the materials—a large part of which represents the cost of paper and of fuel and power—used by all six branches of the industry in 1909 was \$201,774,590, which is equal to 27.3 per cent of the gross value of products, although it constituted a somewhat larger proportion of the value of products obtained by deducting expenditures for contract work.

The establishments in the industry as a whole gave employment to an average of 388,466 persons, of whom 258,434 were wage earners, and paid out \$268,086,431 in salaries and wages.

Of the 31,445 establishments canvassed in 1909 approximately three-fifths were engaged in the pub-

lishing of newspapers and periodicals. These establishments employed 108,672 wage earners, or 42 per cent of the total for the industry, and reported products to the value of \$406,090,122, or 55 per cent of the total value of products reported for the industry as a whole. A large proportion of the "value of products" of this branch of the industry represents payments received for advertising.

Establishments engaged chiefly in book publishing or in job printing, or both, formed 34.1 per cent of the total number of establishments, reported 34 per cent of the total value of products, and employed 42.1 per cent of the total number of wage earners. The 178 establishments engaged solely or chiefly in music publishing contributed only three-fourths of 1 per cent of the total value of all products. The other branches of the industry reported the following proportions of the total value of products: Bookbinding and blank-book making, 4.3 per cent; steel and copper-plate engraving and plate printing, 1.3 per cent; and lithographing, 4.6 per cent. The significance of these percentages is, of course, dependent on the extent of the duplication, not only in the total value of products of the industry, but also within the different branches of it.

Related industries.—There are several industries so closely related to that of printing and publishing that it is impracticable to draw any distinct line of demarcation between them and the industry under discussion. A large amount of work similar to that reported by some of them is done in printing and publishing establishments. Among the more important of these industries are wood engraving, photo-engraving, the manufacture of miscellaneous printing materials, stereotyping and electrotyping, and type founding. Statistics of these industries for 1909 are summarized in Table 2. Two industries necessarily included in the group of "paper and printing" in Volume VIII ("engraving and diesinking" and "wall paper") have no relation to job printing or publishing and are omitted here.

	Total for related industries.	ESTABLISHMENTS ENGAGED PRIMARILY IN—				
		Wood engraving.	Photo-engraving.	Manufacturing printing materials.	Stereotyping and electrotyping.	Type founding.
Number of establishments.....	691	82	313	93	174	29
Persons engaged in the industry.....	14, 015	480	7, 277	787	3, 661	1, 810
Proprietors and firm members.....	533	89	233	61	133	17
Salariat employees.....	2, 945	73	1, 701	191	678	302
Wage earners (average number).....	10, 537	318	5, 343	535	2, 850	1, 491
Primary horsepower.....	8, 701	39	2, 638	663	4, 076	1, 285
Capital.....	\$16, 285, 267	\$192, 762	\$5, 473, 760	\$1, 620, 269	\$3, 825, 833	\$5, 172, 643
Expenses.....	20, 579, 538	567, 270	10, 127, 393	1, 728, 333	5, 616, 521	2, 540, 021
Services.....	11, 802, 587	340, 270	6, 599, 236	612, 619	3, 112, 591	1, 137, 871
Salaries.....	3, 291, 139	81, 692	1, 849, 190	257, 781	800, 487	301, 989
Wages.....	8, 511, 448	258, 578	4, 750, 046	354, 838	2, 312, 104	835, 882
Materials.....	5, 797, 414	126, 101	2, 133, 980	760, 886	1, 765, 102	1, 011, 345
Miscellaneous.....	2, 979, 537	100, 899	1, 394, 177	354, 828	738, 828	390, 805
Value of products.....	23, 422, 479	711, 270	11, 624, 000	1, 982, 416	6, 383, 694	2, 721, 090
Value added by manufacture (value of products less cost of materials).....	17, 625, 065	585, 178	9, 490, 020	1, 221, 530	4, 618, 592	1, 709, 745

Of the related industries covered by the table, photo-engraving and stereotyping and electrotyping are the most important, as measured by total value

of products, the former reporting substantially one-half and the latter more than one-fourth of the total for the five industries.

Comparison with earlier censuses.—Comparable statistics for the industry as a whole are not available for censuses prior to 1889. Statistics for book and job printing and publishing were first reported separately in 1869, when there were 960 establishments, employing a total of 17,613 wage earners, and reporting products valued at \$41,075,971. Statistics for music printing and publishing were first shown separately at the census of 1859, only two establishments being reported; the industry was next reported separately at the census of 1889. Statistics for the printing and publishing of newspapers and periodicals were first shown separately at the census of 1869, in which year the returns showed 1,199 establishments, employing a total of 13,130 wage earners, and reporting products valued at \$25,393,029. There was a special report on newspapers and periodicals at the census of 1879, but the statistics gathered were not sufficiently comprehensive for use in comparison with those of

later censuses. Bookbinding and blank-book making, the returns for which prior to 1909 were not combined with those for the printing and publishing industry, were treated as a separate industry as far back as the census of 1849, in which year there were 235 establishments in the industry, employing 3,468 wage earners, and reporting products valued at \$3,225,678. Statistics for steel and copper plate engraving, including plate printing, were first given separately at the census of 1879, 55 establishments reporting a total of 1,916 wage earners and products valued at \$2,998,616. Lithographing was first shown separately at the census of 1849, when there were 11 establishments, employing a total of 162 wage earners and reporting products valued at \$136,000.

Table 3 summarizes the statistics for the printing and publishing industry as a whole, for each census from 1889 to 1909, inclusive.

Table 3

PRINTING AND PUBLISHING—ALL BRANCHES COMBINED.

	Number or amount.				Per cent of increase. ¹			
	1909	1904	1899	1889	1899-1909	1904-1909	1899-1904	1889-1899
	Number of establishments.....	31,445	27,793	23,814	17,724	32.0	13.1	16.7	34.4
Persons engaged in the industry.....	388,466	316,047	(²)	(²)	.....	22.9	.....	.....
Proprietors and firm members.....	30,424	28,368	(²)	(²)	.....	7.2	.....	.....
Salaried employees.....	99,608	68,592	40,685	(²)	144.8	45.2	68.6	.....
Wage earners (average number).....	258,434	219,087	195,260	161,261	32.4	18.0	12.2	(³)
Primary horsepower.....	297,763	166,380	119,775	67,453	148.6	79.0	38.9	77.6
Capital.....	\$588,345,708	\$432,853,984	\$333,003,432	\$223,863,781	76.7	35.9	30.0	48.8
Expenses.....	619,158,045	446,599,477	308,446,296	252,387,964	104.0	38.6	47.2	20.2
Services.....	268,086,431	194,944,287	139,291,335	121,015,783	92.5	37.5	40.0	15.1
Salaries.....	103,458,251	67,748,298	39,475,220	(²)	162.1	52.7	71.6	.....
Wages.....	164,628,180	127,195,989	99,816,115	(²)	64.9	29.4	27.4	.....
Materials.....	201,774,590	142,514,182	103,654,284	81,874,561	94.7	41.6	37.5	26.6
Miscellaneous.....	149,297,024	109,141,008	60,500,677	49,497,620	146.8	36.8	80.4	22.2
Value of products.....	737,876,087	552,473,353	395,186,629	313,856,256	86.7	33.6	39.8	25.9
Value added by manufacture (value of products less cost of materials).....	536,101,497	409,959,171	291,532,345	231,981,695	83.9	30.8	40.6	25.7

¹ Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

Notwithstanding certain elements of possible incomparability in the figures, it is evident that there was a much more rapid development in the industry from 1899 to 1909 than during the preceding decade. During the more recent period the number of salaried employees more than doubled, the number of wage earners increased almost one-third, and the value of products increased nearly seven-eighths.

Growth of different branches of the industry from 1899 to 1909.—Table 4 shows, for the six branches of the industry separately, the most important statistical items for 1909 and 1899.

The publishing of newspapers and periodicals, the largest of the six branches of the industry, showed marked increases during the decade 1899-1909 in all respects except in average number of wage earners. The comparatively small gain in this particular is due to the increased use of typesetting and typesetting machines; it is worthy of note that notwithstanding the small increase in number of wage earners the

total wages paid increased 47.8 per cent. The increase in value of products was 82.1 per cent.

The relative increases in the next largest branch of the industry, book publishing and book and job printing, were much greater than in the case of newspapers and periodicals, the average number of wage earners increasing 60.8 per cent, while the reported value of products more than doubled. The bookbinding and blank-book making and lithographing branches reported about the same percentage of increase in value of products. The average number of wage earners increased 24.8 per cent in the former, and 16 per cent in the latter branch.

The printing and publishing of music was the least important of the branches of the industry, as measured by value of products, in 1909, but its rate of growth for the decade was much more rapid than that of any other branch. In addition to the music printed by establishments in this branch of the industry, considerable quantities are printed in establishments doing book and job work.

Table 4	ESTABLISHMENTS ENGAGED PRIMARILY IN—								
	Printing and publishing, book and job.			Printing and publishing, music.			Printing and publishing, newspapers and periodicals.		
	1909	1899	Per cent of increase: 1899-1909	1909	1899	Per cent of increase: 1899-1909	1909	1899	Per cent of increase: 1899-1909
Number of establishments.....	10,708	6,919	54.8	178	87	104.6	18,871	15,305	23.3
Persons engaged in the industry.....	141,337	(²)		1,800	1,187	51.6	196,620	138,159	42.3
Proprietors and firm members.....	10,778	(²)		162	95	70.5	17,890	15,976	12.0
Salaried employees.....	22,472	9,906	126.9	900	314	186.6	70,058	27,579	154.0
Wage earners (average number).....	108,687	67,610	60.8	738	778	-5.1	108,672	94,604	14.9
Primary horsepower.....	97,546	36,973	163.8	365	312	17.0	173,859	70,089	148.1
Capital.....	\$202,662,435	\$97,758,968	107.3	\$3,591,381	\$2,313,966	55.2	\$314,740,917	\$192,443,708	63.5
Expenses.....	212,598,947	95,253,828	123.2	4,498,709	1,732,488	159.7	336,376,872	166,108,388	102.5
Services.....	91,561,755	42,372,114	116.1	1,323,653	619,717	113.6	143,700,525	77,348,842	85.8
Salaries.....	25,040,439	8,830,413	183.6	884,725	244,515	261.8	69,298,932	27,015,791	156.5
Wages.....	66,521,316	33,541,701	98.3	438,928	375,202	17.0	74,401,593	50,333,051	47.8
Materials.....	77,650,547	36,191,582	114.6	986,202	449,674	119.3	97,359,605	50,214,904	93.9
Miscellaneous.....	43,386,645	16,690,132	160.0	2,188,854	663,097	230.1	95,316,742	38,544,642	147.3
Value of products.....	250,925,934	121,798,476	106.0	5,575,903	2,272,385	145.4	406,090,122	222,983,569	82.1
Value added by manufacture (value of products less cost of materials).....	173,275,387	85,606,894	102.4	4,589,701	1,822,711	151.8	308,730,517	172,768,665	78.7
	Bookbinding and blank-book making.			Engraving, steel and copper plate, including plate printing.			Lithographing.		
	1909	1899	Per cent of increase: 1899-1909	1909	1899	Per cent of increase: 1899-1909	1909	1899	Per cent of increase: 1899-1909
Number of establishments.....	1,054	954	10.5	316	286	10.5	318	263	20.9
Persons engaged in the industry.....	23,698	18,138	30.7	6,479	3,947	64.1	17,932	14,731	21.7
Proprietors and firm members.....	1,066	1,091	-2.3	330	331	-0.3	198	240	-17.5
Salaried employees.....	2,694	1,076	150.4	823	313	162.9	2,661	1,497	77.8
Wage earners (average number).....	19,938	15,971	24.8	5,326	3,303	61.2	15,073	12,994	16.0
Primary horsepower.....	10,099	4,689	115.4	2,732	649	321.0	13,132	7,063	85.9
Capital.....	\$22,935,362	\$12,744,628	80.0	\$7,242,200	\$5,066,020	43.0	\$37,173,413	\$22,676,142	63.9
Expenses.....	27,530,441	17,027,935	61.7	7,878,383	3,996,512	97.1	30,274,693	19,327,145	56.6
Services.....	12,855,649	7,749,456	65.9	4,539,966	2,350,650	93.1	14,104,883	8,850,556	59.4
Salaries.....	3,179,379	1,077,790	195.0	1,152,077	338,323	240.5	3,902,699	1,968,388	98.3
Wages.....	9,676,270	6,671,666	45.0	3,387,889	2,012,327	68.4	10,202,184	6,882,168	48.2
Materials.....	11,629,906	7,702,543	51.0	2,217,599	1,209,536	83.3	11,930,731	7,866,045	51.3
Miscellaneous.....	3,044,886	1,575,936	93.2	1,120,818	436,326	156.9	4,239,079	2,590,544	63.6
Value of products.....	31,742,416	20,790,858	52.7	9,432,479	5,100,662	84.9	34,109,233	22,240,679	53.4
Value added by manufacture (value of products less cost of materials).....	20,112,510	13,088,315	53.7	7,214,880	3,891,126	85.4	22,178,502	14,354,634	54.5

¹ A minus sign (-) denotes decrease.² Comparable figures not available.

SUMMARY, BY STATES.

The industry as a whole.—Table 5 summarizes the more important statistics for the industry as a whole, by states, the states being arranged according to the

value of products reported for 1909. Percentages of increase, such as are shown for certain branches of the industry in other tables, are not shown here because for many of the states the data of previous censuses are not sufficiently comparable.

Table 5

PRINTING AND PUBLISHING—ALL BRANCHES COMBINED: 1909

STATE.	Number of establishments.	Wage earners.			Value of products.			Value added by manufacture.		
		Average number.	Per cent of total.	Rank.	Amount.	Per cent of total.	Rank.	Amount.	Per cent of total.	Rank.
United States	31,446	258,434	100.0	.....	\$737,876,037	100.0	.....	\$536,101,497	100.0	.....
New York.....	4,426	63,120	24.4	1	216,946,452	29.4	1	160,452,222	29.9	1
Illinois.....	2,608	28,644	11.1	2	87,247,090	11.8	2	62,567,117	11.7	2
Pennsylvania.....	2,461	24,696	9.6	3	70,584,179	9.5	3	47,831,430	8.9	3
Massachusetts.....	1,279	17,532	6.8	4	47,445,008	6.4	4	34,564,455	6.4	4
Ohio.....	1,656	15,756	6.1	5	41,657,306	5.6	5	29,752,952	5.5	5
Missouri.....	1,322	10,790	4.2	6	29,651,153	4.0	6	21,024,401	3.9	6
California.....	1,240	7,556	2.9	7	25,031,877	3.4	7	18,704,574	3.5	7
Michigan.....	1,045	7,219	2.8	8	17,348,341	2.3	8	12,413,815	2.3	8
Minnesota.....	950	5,641	2.2	10	15,982,212	2.2	9	11,886,107	2.2	9
Indiana.....	892	6,756	2.6	9	14,356,376	1.9	10	10,331,836	1.9	10
New Jersey.....	684	5,451	2.1	11	12,332,700	1.7	11	8,860,549	1.7	11
Iowa.....	1,110	4,853	1.9	13	12,128,657	1.6	12	8,841,560	1.6	12
Wisconsin.....	833	5,360	2.1	12	11,860,644	1.6	13	8,474,538	1.6	14
Texas.....	1,067	4,408	1.7	14	11,587,255	1.6	14	8,780,015	1.6	13
Washington.....	506	2,624	1.0	20	9,283,188	1.3	15	7,062,598	1.3	15
Maryland.....	371	3,386	1.3	15	8,359,779	1.1	16	5,895,391	1.1	16
Tennessee.....	413	2,914	1.1	18	7,173,230	1.0	17	5,219,645	1.0	17
Kansas.....	798	3,232	1.2	16	7,008,865	0.9	18	4,719,059	0.9	22
Colorado.....	439	2,366	0.9	23	6,961,721	0.9	19	5,155,609	1.0	18
Nebraska.....	674	2,329	0.9	24	6,667,290	0.9	20	4,955,946	0.9	19
Kentucky.....	431	3,135	1.2	17	6,453,842	0.9	21	4,808,658	0.9	21
Georgia.....	442	2,395	0.9	22	6,400,241	0.9	22	4,812,466	0.9	20
Connecticut.....	363	2,878	1.1	19	6,370,450	0.9	23	4,601,233	0.9	23
Virginia.....	369	2,555	1.0	21	5,369,738	0.7	24	3,964,864	0.7	24
Oregon.....	324	1,459	0.6	29	5,040,523	0.7	25	3,937,110	0.7	25
District of Columbia.....	156	1,565	0.6	27	4,899,492	0.7	26	3,804,610	0.7	28
Oklahoma.....	598	1,698	0.7	25	3,988,542	0.5	27	2,984,419	0.6	27
Louisiana.....	268	1,544	0.6	28	3,823,473	0.5	28	2,810,180	0.5	28
Rhode Island.....	147	1,454	0.6	30	3,780,075	0.5	29	2,716,400	0.5	29
Maine.....	195	1,651	0.6	26	3,437,812	0.5	30	2,336,192	0.4	30
Alabama.....	274	1,117	0.4	33	2,768,247	0.4	31	2,102,254	0.4	31
North Carolina.....	322	1,376	0.5	31	2,497,493	0.3	32	1,852,764	0.3	32
Utah.....	122	967	0.4	35	2,404,602	0.3	33	1,681,341	0.3	34
Montana.....	135	691	0.3	41	2,111,229	0.3	34	1,708,569	0.3	33
Arkansas.....	295	981	0.4	34	2,082,365	0.3	35	1,546,742	0.3	35
West Virginia.....	235	1,255	0.5	32	1,992,036	0.3	36	1,451,498	0.3	38
South Dakota.....	392	825	0.3	38	1,975,976	0.3	37	1,519,482	0.3	36
North Dakota.....	330	788	0.3	39	1,909,514	0.3	38	1,469,733	0.3	37
Florida.....	174	905	0.3	36	1,865,848	0.3	39	1,431,639	0.3	39
South Carolina.....	161	834	0.3	37	1,600,591	0.2	40	1,260,672	0.2	40
Mississippi.....	225	736	0.3	40	1,307,604	0.2	41	1,007,511	0.2	41
Idaho.....	132	468	0.2	44	1,148,033	0.2	42	905,129	0.2	42
New Hampshire.....	143	677	0.3	42	1,130,647	0.2	43	871,858	0.2	43
Vermont.....	115	666	0.3	43	1,038,843	0.1	44	789,033	0.1	44
Arizona.....	64	268	0.1	47	784,487	0.1	45	616,420	0.1	45
New Mexico.....	93	283	0.1	46	588,782	0.1	47	467,739	0.1	46
Nevada.....	54	180	0.1	48	519,243	0.1	48	406,728	0.1	47
Wyoming.....	65	182	0.1	49	489,544	0.1	48	399,472	0.1	48
Delaware.....	48	288	0.1	45	480,464	0.1	49	342,912	0.1	49

New York is by far the most important state in the printing and publishing industry. This state reported nearly one-fourth of all the wage earners in the industry and almost three-tenths of the total value of prod-

ucts. Illinois ranked second and Pennsylvania third. The majority of the states held the same or practically the same rank in "value added by manufacture" as in value of products.

Table 7

PRINTING AND PUBLISHING, MUSIC.

Table with columns for STATE, Wage earners (Average number, Per cent of total), Value of products (Amount, Per cent of total), Value added by manufacture (Amount, Per cent of total), and Per cent of increase (Wage earners, Value of products, Value added by manufacture) for years 1899-1904. Includes data for United States and various states.

1 A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or is less than \$100,000 for value of products or value added by manufacture, or where to give percentages would lead to the disclosure of individual operations.

Newspapers and periodicals.—Table 8 summarizes, paper and periodical branch of the printing and publishing industry, the more important statistics for the news-

Table 8

PRINTING AND PUBLISHING, NEWSPAPERS AND PERIODICALS.

Table with columns for STATE, Wage earners (Average number, Per cent of total, Rank), Value of products (Amount, Per cent of total, Rank), Value added by manufacture (Amount, Per cent of total, Rank), and Per cent of increase (Wage earners, Value of products, Value added by manufacture) for years 1899-1904. Includes data for United States and 48 states.

1 A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or less than \$100,000 for value added by manufacture.

As the great bulk of newspaper circulation is local in character, the rank of a state in the publication of newspapers and periodicals is likely to correspond roughly with its rank in population. The publication of periodicals other than newspapers is, however, very largely confined to a few great cities, from which these publications are distributed over a wide area, so that the rank of a state in this line of printing and publishing may have little correspondence with its rank in population.

New York, which was first in population in 1910, was also first in value of products of newspapers and periodicals in 1909; Pennsylvania was second and Illinois third in both respects. Massachusetts, however, although sixth in population, ranked fourth in the value of products of this branch of the industry, and

Ohio, which was fourth in population, ranked fifth in value of products. But the greatest difference in this respect shown by any of the leading states appears in the case of Minnesota, which, although nineteenth in population, was eighth in the value of products reported by establishments publishing newspapers and periodicals.

The highest percentage of increase in average number of wage earners from 1899 to 1909 was shown by Oklahoma (156.1 per cent); the highest in value of products (401.3 per cent) and in value added by manufacture (375 per cent) by the state of Washington.

Bookbinding and blank-book making.—Table 9 summarizes, by states, the more important statistics for the bookbinding and blank-book making branch of the industry.

Table 9

BOOKBINDING AND BLANK-BOOK MAKING.

STATE.	Number of establishments: 1909	Wage earners.		Value of products.		Value added by manufacture.		Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Amount: 1909	Per cent of total: 1909	Amount: 1909	Per cent of total: 1909	Wage earners (average number).			Value of products.			Value added by manufacture.		
								1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
															1899-1909	1904-1909	1899-1904
United States.....	1,054	19,938	100.0	\$31,742,416	100.0	\$20,112,510	100.0	24.8	12.6	10.9	52.7	25.8	21.3	53.7	25.0	22.9
New York.....	354	8,430	42.3	13,544,524	42.7	8,614,698	42.8	17.9	5.6	11.6	49.7	21.3	23.4	45.6	17.7	23.7
Massachusetts.....	94	2,763	13.9	3,729,355	11.7	2,415,784	12.0	5.9	10.3	-4.0	3.1	9.9	-6.2	9.6	21.8	-10.0
Pennsylvania.....	122	2,098	10.5	3,401,166	10.7	2,002,591	10.0	30.6	5.7	23.6	70.6	14.6	48.9	54.5	9.3	41.3
Illinois.....	92	1,749	8.8	2,838,815	8.9	1,892,957	9.4	31.6	12.0	17.5	44.0	10.6	30.2	73.8	16.0	49.8
Michigan.....	32	781	3.9	1,634,672	5.1	897,403	4.5	300.5	244.1	16.4	595.4	272.2	86.8	502.7	310.3	46.9
Ohio.....	52	628	3.1	884,715	2.8	597,304	3.0	58.2	64.0	-3.5	61.1	93.6	16.8	57.9	88.7	-16.3
Missouri.....	30	529	2.7	810,126	2.6	563,610	2.8	52.9	37.8	11.0	110.8	68.1	25.4	115.7	60.7	34.2
New Jersey.....	30	548	2.7	795,657	2.5	486,134	2.4	131.2	85.8	24.5	234.5	96.0	70.6	187.1	66.4	72.5
Wisconsin.....	32	592	3.0	787,240	2.5	460,563	2.3	4.8	-13.1	20.5	32.7	-0.7	33.6	44.8	2.1	41.9
California.....	28	290	1.5	608,659	1.9	449,332	2.2	28.9	-38.0	108.0	154.9	-4.3	166.3	155.8	-1.6	160.0
Minnesota.....	23	240	1.2	445,653	1.4	273,320	1.4	19.4	35.6	-11.9	24.9	35.7	-7.9	69.2	18.1	43.2
Indiana.....	16	142	0.7	412,641	1.3	160,728	0.8	-34.6	.....	-57.1	-17.0	43.8	-42.3	-25.2	47.2	-49.1
Kansas.....	7	81	0.4	219,844	0.7	151,700	0.8	.....	.....	.....	4.9	.....	.....	.....	.....	.....
Maryland.....	19	183	0.9	181,519	0.6	143,004	0.7	-6.6	24.5	-25.0	4.7	28.0	-18.2	4.3	27.5	-18.2
Virginia.....	6	166	0.8	179,073	0.6	111,837	0.6	45.6	-1.8	48.2	.....	36.8	.....	.....	.....	.....
Maine.....	8	99	0.5	178,069	0.6	117,206	0.6	.....	-2.0	.....	.....	39.9	.....	.....	.....	.....
Iowa.....	14	75	0.4	145,866	0.5	112,522	0.6	.....	.....	.....	4.2	.....	.....	.....	9.1	.....
District of Columbia.....	9	64	0.3	140,190	0.4	80,424	0.4	.....	.....	.....	.....	.....	.....	.....	.....	.....
Connecticut.....	17	64	0.3	101,422	0.3	64,777	0.3	.....	.....	.....	.....	-3.0	.....	.....	.....	.....
Washington.....	12	45	0.2	101,315	0.3	65,511	0.3	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	57	371	1.9	601,895	1.9	447,604	2.2	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or is less than \$100,000 for value of products or value added by manufacture, or where to give percentages would lead to the disclosure of individual operations.

New York, which led in this branch of the industry, reported 42.7 per cent of the total value of products in 1909. Massachusetts was second and Pennsylvania third, but the production of these two states combined was slightly more than one-half that of New York alone.

Of the states for which figures are given, Michigan reported the highest percentages of increase from 1899 to 1909 in the average number of wage earners (300.5 per cent) and in value of products (595.4 per cent).

Engraving, steel and copper plate, including plate

printing.—Table 10 summarizes, by states, the more important statistics for establishments engaged primarily in steel and copper plate engraving, including plate printing.

The three leading states in 1909 were New York, Illinois, and Pennsylvania. In number of wage earners, value of products, and value added by manufacture, the percentage of gain for the decade 1899-1909 was much higher in Illinois than in either of the other two states.

Table 10

ENGRAVING, STEEL AND COPPER PLATE, INCLUDING PLATE PRINTING.

STATE.	Number of establishments: 1909	Wage earners.		Value of products.		Value added by manufacture.		Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Amount: 1909	Per cent of total: 1909	Amount: 1909	Per cent of total: 1909	Wage earners (average number).			Value of products.			Value added by manufacture.		
								1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
								1909	1909	1909	1909	1909	1909	1909	1909	1909
United States.....	318	5,328	100.0	\$9,432,479	100.0	\$7,214,880	100.0	61.2	48.8	8.4	84.9	58.7	16.5	85.4	64.4	12.8
New York.....	96	2,091	39.3	4,219,344	44.7	3,290,600	45.6	24.7	16.5	7.0	54.7	32.8	16.5	64.3	42.8	15.0
Illinois.....	33	976	18.3	1,746,554	18.5	1,221,317	16.9	191.3	120.8	31.9	247.0	128.2	52.1	195.8	123.8	32.1
Pennsylvania.....	40	878	18.4	1,498,485	15.9	1,137,930	15.8	75.6	66.0	5.7	85.9	62.5	14.4	83.7	65.6	10.9
Massachusetts.....	21	307	5.8	492,654	5.2	397,438	5.5	59.1	86.1	-14.5	39.3	84.9	-24.7	36.5	102.2	-32.5
Missouri.....	13	110	2.1	157,074	1.7	123,261	1.7				35.2	1.5	33.2		1.2	
New Jersey.....	8	90	1.7	146,148	1.5	120,514	1.7									
District of Columbia.....	7	101	1.8	131,588	1.4	106,854	1.5									
Kentucky.....	4	106	2.0	119,924	1.3	92,390	1.3									
Oregon.....	7	52	1.0	109,732	1.2	94,726	1.3									
California.....	10	46	0.9	101,678	1.1	81,715	1.1									
All other states.....	77	469	8.8	709,298	7.5	548,135	7.6									

¹ A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or less than \$100,000 for value of products or value added by manufacture.

Lithographing.—Table 11 summarizes, by states, the more important statistics for establishments engaged primarily in lithographing. New York, Ohio, and Illinois were the leading states in 1909. Decreases for

the decade in number of wage earners, value of products, and value added by manufacture are shown in several states, but gains in other states resulted in marked increases for the United States.

Table 11

LITHOGRAPHING.

STATE.	Number of establishments: 1909	Wage earners.		Value of products.		Value added by manufacture.		Per cent of increase. ¹								
		Average number: 1909	Per cent of total: 1909	Amount: 1909	Per cent of total: 1909	Amount: 1909	Per cent of total: 1909	Wage earners (average number).			Value of products.			Value added by manufacture.		
								1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
								1909	1909	1909	1909	1909	1909	1909	1909	1909
United States.....	318	15,073	100.0	\$34,109,233	100.0	\$22,178,502	100.0	16.0	19.5	-2.9	53.4	35.1	13.5	54.5	31.3	17.7
New York.....	131	6,324	42.0	14,539,656	42.6	9,326,957	42.1	-0.2	2.6	-2.7	31.4	16.3	13.0	28.2	10.2	16.4
Ohio.....	24	1,736	11.5	3,870,147	11.3	2,517,059	11.3	3.5	30.1	-20.5	41.7	46.2	-3.1	54.3	44.2	7.0
Illinois.....	29	963	6.4	2,446,952	7.2	1,502,566	6.8	53.6	51.4	1.4	74.3	69.6	2.8	102.5	56.7	29.2
Massachusetts.....	15	1,044	6.9	2,222,332	6.5	1,529,283	6.9	-3.2	16.8	-17.1	24.2	29.7	-4.2	24.0	34.3	-7.7
Pennsylvania.....	28	983	6.5	2,078,712	6.1	1,304,556	5.9	31.6	30.5	0.8	89.1	48.1	27.7	76.4	47.9	19.3
California.....	15	663	4.4	1,643,923	4.8	1,040,061	4.7	57.5	38.7	13.5	128.7	62.3	40.9	131.3	59.6	44.9
Wisconsin.....	10	554	3.7	1,153,013	3.4	758,901	3.4	29.7	12.1	15.7	61.1	34.9	19.4	53.4	30.8	17.3
Maryland.....	6	390	2.6	798,601	2.3	484,941	2.2	38.8	18.5	17.1	59.8	24.4	28.5	51.9	18.1	28.7
Missouri.....	12	259	1.7	622,092	1.8	420,028	1.9	-32.7	-25.6	-9.6	-9.6	-18.1	10.4	-10.7	-15.3	5.4
Michigan.....	5	316	2.1	567,765	1.7	360,181	1.6	-7.9	-12.2	5.0	20.9	-21.0	52.9	13.7	-27.7	57.2
Washington.....	3	70	0.5	185,491	0.5	114,214	0.5									
All other states.....	40	1,771	11.7	3,980,549	11.7	2,819,755	12.7									

¹ A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or less than \$100,000 for value of products.

PERSONS ENGAGED IN THE INDUSTRY.

Summary: 1909.—Table 12 shows, for 1909, the number of persons engaged in the printing and publishing industry as a whole and in each of its six branches, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the industry as a whole during 1909 was 388,466, of whom 258,434, or 66.5 per cent, were wage earners,

49,332, or 12.7 per cent, proprietors and officials, and 80,700, or 20.8 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 301,681, or 77.7 per cent, were males, and 86,785, or 22.3 per cent, females.

Of the clerks and other subordinate salaried employees, 32 per cent, and of the wage earners 16 years of age and over, 23 per cent, were females. The average number of wage earners under 16 years of age was only 6,333, of which number about one-sixth were girls. Children constituted only 2.5 per cent of the total number of wage earners.

Table 12

BRANCH OF INDUSTRY AND CLASS OF PERSONS.

	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
Printing and publishing—all branches combined	388,466	301,681	86,785
Proprietors and officials.....	49,332	47,351	1,981
Proprietors and firm members.....	30,424	29,130	1,294
Salaried officers of corporations.....	7,265	6,952	313
Superintendents and managers.....	11,643	11,269	374
Clerks.....	80,700	54,905	25,795
Wage earners (average number).....	258,434	199,425	59,009
16 years of age and over.....	252,101	194,175	57,926
Under 16 years of age.....	6,333	5,250	1,083
Printing and publishing, newspapers and periodicals	196,620	157,815	38,705
Proprietors and officials.....	28,587	27,335	1,252
Proprietors and firm members.....	17,890	17,075	815
Salaried officers of corporations.....	3,470	3,295	175
Superintendents and managers.....	7,227	6,965	262
Clerks.....	59,361	41,312	18,049
Wage earners (average number).....	108,672	89,268	19,404
16 years of age and over.....	105,986	86,794	19,192
Under 16 years of age.....	2,686	2,474	212
Printing and publishing, book and job	141,837	110,145	31,792
Proprietors and officials.....	17,279	16,683	596
Proprietors and firm members.....	10,778	10,371	407
Salaried officers of corporations.....	2,949	2,841	108
Superintendents and managers.....	3,552	3,471	81
Clerks.....	15,971	9,948	6,023
Wage earners (average number).....	108,687	83,514	25,173
16 years of age and over.....	106,027	81,326	24,701
Under 16 years of age.....	2,660	2,188	472
Printing and publishing, music	1,600	1,290	510
Proprietors and officials.....	284	270	14
Proprietors and firm members.....	162	151	11
Salaried officers of corporations.....	70	67	3
Superintendents and managers.....	52	52	.....
Clerks.....	778	421	357
Wage earners (average number).....	738	599	139
16 years of age and over.....	729	592	137
Under 16 years of age.....	9	7	2
Lithographing	17,832	14,670	3,262
Proprietors and officials.....	803	788	15
Proprietors and firm members.....	198	194	4
Salaried officers of corporations.....	326	318	8
Superintendents and managers.....	279	276	3
Clerks.....	2,056	1,568	488
Wage earners (average number).....	15,073	12,314	2,759
16 years of age and over.....	14,890	12,175	2,715
Under 16 years of age.....	183	139	44
Bookbinding and blank-book making	23,648	13,375	10,273
Proprietors and officials.....	1,792	1,714	78
Proprietors and firm members.....	1,066	1,026	40
Salaried officers of corporations.....	349	335	14
Superintendents and managers.....	377	353	24
Clerks.....	1,968	1,335	633
Wage earners (average number).....	19,938	10,326	9,612
16 years of age and over.....	19,337	10,012	9,325
Under 16 years of age.....	601	314	287
Engraving, steel and copper plate, including plate printing	6,478	4,286	2,193
Proprietors and officials.....	587	561	26
Proprietors and firm members.....	330	313	17
Salaried officers of corporations.....	101	96	5
Superintendents and managers.....	156	152	4
Clerks.....	566	321	245
Wage earners (average number).....	5,326	3,404	1,922
16 years of age and over.....	5,132	3,276	1,856
Under 16 years of age.....	194	128	66

In the newspaper and periodical branch of the industry, editors and managing editors are classed as "superintendents and managers," and subeditors, reporters, and other writers, if regularly employed, as "clerks." Occasional correspondents and other persons collecting information or writing articles for newspapers at space rates are not included among employees at all, and payments to them are included with miscellaneous expenses.

The proportion of female wage earners in the book-binding and blank-book making branch in 1909 was 48.2 per cent; in steel and copper plate engraving, 36.1 per cent; in the newspaper and periodical branch, 17.9 per cent; in lithographing, 18.3 per cent, and in book and job printing and publishing, 23.2 per cent.

The average number of wage earners in each state in the industry as a whole for 1909, 1904, and 1899 is given in Table 66. The average number distributed by sex and age is not shown for the individual states, but Table 67 gives such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of the persons engaged in the industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made for the industry as a whole in Table 13.

Table 13

CLASS.	PERSONS ENGAGED IN THE INDUSTRY—ALL BRANCHES COMBINED.				
	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total	388,466	100.0	316,047	100.0	22.9
Proprietors and firm members.....	30,424	7.8	23,368	9.0	7.2
Salaried employees.....	99,608	25.6	68,592	21.7	45.2
Wage earners (average number).....	258,434	66.5	219,087	69.3	18.0

Table 14 shows the average number of wage earners in the industry as a whole, distributed according to age, and in the case of those 16 years of age or over, according to sex, for 1909, 1904, and 1899. Little change in conditions is shown from census to census, except that the proportion of children reported was much lower in 1909 and 1904 than in 1899.

Table 14

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY—ALL BRANCHES COMBINED.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total	258,434	100.0	219,087	100.0	185,260	100.0
16 years of age and over.....	252,101	97.5	213,213	97.3	185,989	95.3
Male.....	194,175	75.1	163,917	74.8	146,121	74.5
Female.....	57,926	22.4	49,296	22.5	39,868	20.4
Under 16 years of age.....	6,333	2.4	5,874	2.7	9,271	4.7

Wage earners employed, by months.—Table 15 gives, for the industry as a whole, the number of wage earners employed on the 15th (or the nearest representative day) of each month during the year 1909 for 42 states and the District of Columbia in which an average of 500 or more wage earners were employed.

Table 15 WAGE EARNERS EMPLOYED IN THE INDUSTRY—ALL BRANCHES COMBINED: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	258,434	256,480	257,342	258,805	256,532	255,470	253,550	251,757	252,543	258,707	263,715	266,378	269,884
Alabama.....	1,117	1,114	1,104	1,108	1,102	1,104	1,103	1,100	<i>1,098</i>	1,112	1,141	1,156	1,182
Arkansas.....	981	991	986	981	963	961	<i>952</i>	967	973	974	998	1,008	1,018
California.....	7,556	7,350	7,410	7,491	7,526	7,571	7,471	7,421	7,417	7,578	7,720	7,784	7,825
Colorado.....	2,366	2,309	2,324	2,316	2,346	<i>2,307</i>	2,366	2,378	2,373	2,377	2,400	2,410	2,453
Connecticut.....	2,578	2,885	2,944	2,902	2,920	2,880	2,830	2,835	<i>2,793</i>	2,841	2,891	2,917	2,907
District of Columbia.....	1,565	1,591	1,599	1,614	1,577	1,572	1,545	1,483	<i>1,478</i>	1,524	1,591	1,606	1,609
Florida.....	905	907	927	917	<i>855</i>	854	873	873	888	895	931	950	984
Georgia.....	2,395	2,381	2,355	2,386	2,374	2,373	<i>2,343</i>	2,356	2,371	2,435	2,446	2,430	2,483
Illinois.....	28,644	28,516	28,776	29,015	28,350	27,908	<i>27,869</i>	27,953	28,500	28,945	29,398	29,054	29,892
Indiana.....	6,756	6,733	6,761	6,764	6,749	6,690	<i>6,610</i>	6,617	6,742	6,889	6,870	6,870	6,883
Iowa.....	4,853	4,893	4,909	4,895	4,867	4,781	4,720	<i>4,702</i>	4,736	4,804	4,889	4,975	5,052
Kansas.....	3,232	3,176	3,190	3,226	3,202	3,177	3,162	<i>3,155</i>	3,196	3,242	3,316	3,349	3,413
Kentucky.....	3,135	3,149	3,151	3,163	3,146	3,144	3,103	3,078	<i>3,069</i>	3,108	3,150	3,160	3,202
Louisiana.....	1,544	1,530	<i>1,522</i>	1,543	1,538	1,531	1,526	1,528	1,531	1,537	1,571	1,582	1,598
Maine.....	1,651	1,672	1,725	1,789	1,701	1,632	1,584	1,558	<i>1,537</i>	1,555	1,627	1,695	1,736
Maryland.....	3,386	3,362	3,362	3,383	3,355	3,370	3,354	3,303	<i>3,295</i>	3,366	3,466	3,474	3,530
Massachusetts.....	17,532	17,750	17,750	17,757	17,643	17,351	17,260	16,868	<i>16,746</i>	17,413	17,707	17,988	18,158
Michigan.....	7,219	7,090	7,090	7,117	7,074	7,074	7,100	7,160	<i>7,226</i>	7,283	7,393	7,441	7,578
Minnesota.....	5,641	5,608	5,635	5,613	5,586	5,519	5,533	<i>5,513</i>	5,583	5,644	5,744	5,807	5,905
Mississippi.....	736	727	731	723	714	712	722	723	737	748	759	764	785
Missouri.....	10,790	10,587	10,744	10,784	10,751	10,747	10,618	<i>10,503</i>	10,584	10,817	10,967	11,161	11,218
Montana.....	691	<i>667</i>	676	678	676	682	687	695	700	697	709	705	718
Nebraska.....	2,329	<i>2,279</i>	2,284	2,294	2,294	2,315	2,300	2,285	2,303	2,335	2,388	2,446	2,417
New Hampshire.....	677	708	721	703	671	667	666	654	<i>646</i>	653	665	675	698
New Jersey.....	5,451	5,373	<i>5,245</i>	5,270	5,306	5,433	5,470	5,442	5,366	5,441	5,610	5,732	5,728
New York.....	63,120	62,621	62,849	63,433	62,637	62,481	61,751	<i>61,199</i>	61,422	63,138	64,241	65,534	68,147
North Carolina.....	1,376	1,351	1,369	1,376	1,387	1,364	<i>1,336</i>	1,346	1,362	1,397	1,388	1,433	1,403
North Dakota.....	788	771	777	769	771	785	778	782	780	794	813	817	822
Ohio.....	15,756	15,651	15,641	15,746	15,669	15,419	15,265	<i>15,219</i>	15,499	15,889	16,290	16,356	16,428
Oklahoma.....	1,698	<i>1,686</i>	1,640	1,636	1,648	1,669	1,661	1,688	1,678	1,699	1,804	1,801	1,831
Oregon.....	1,459	1,459	1,453	1,452	1,453	1,456	1,439	<i>1,424</i>	1,437	1,461	1,484	1,487	1,505
Pennsylvania.....	24,696	24,611	24,562	24,669	24,660	24,673	24,160	23,889	<i>23,856</i>	24,653	25,246	25,436	25,938
Rhode Island.....	1,454	<i>1,411</i>	1,413	1,423	1,430	1,420	1,426	1,426	1,456	1,456	1,505	1,556	1,570
South Carolina.....	834	817	841	839	847	848	831	<i>816</i>	818	828	836	843	844
South Dakota.....	825	<i>794</i>	803	816	824	817	825	811	821	827	855	850	858
Tennessee.....	2,914	<i>2,799</i>	2,851	2,873	2,836	2,857	2,925	2,904	2,932	3,011	2,998	2,982	3,002
Texas.....	4,408	4,344	4,347	4,358	<i>4,274</i>	4,300	4,323	4,288	4,295	4,412	4,558	4,607	4,791
Utah.....	967	984	976	974	957	984	978	<i>955</i>	937	962	958	978	1,004
Vermont.....	665	655	677	668	655	661	669	665	<i>649</i>	652	665	680	698
Virginia.....	2,555	2,542	2,526	2,544	2,524	2,532	2,507	<i>2,504</i>	2,517	2,566	2,604	2,642	2,652
Washington.....	2,624	<i>2,589</i>	2,571	2,577	2,580	2,635	2,630	2,630	2,636	2,631	2,676	2,687	2,670
West Virginia.....	1,255	1,241	<i>1,222</i>	1,231	1,239	1,236	1,239	1,242	1,248	1,262	1,279	1,304	1,311
Wisconsin.....	5,360	5,299	5,275	5,363	5,249	5,280	5,294	<i>5,246</i>	5,307	5,346	5,472	5,568	5,632

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed during any month of 1909 was 269,884, in December, and the smallest number 251,757, in July, the minimum number being equal to 93.3 per cent of the maximum. In 1904 also the maximum number (228,441) and the minimum (212,067) were reported for December and July, respectively, the minimum number in that year being equal to 92.8 per cent of the maximum. In 32 of the states, including all of the important ones in the industry, the month of maximum employment was the same as that for the country as a whole (December); but there was considerable variation as to the month of minimum employment, only 12 states reporting July, the month returned by the country as a whole. New York and Ohio reported their minimum number of wage earners for July, Illinois for June, and Massachusetts and Pennsylvania for August.

In the two leading branches of the industry, book

and job printing, and newspaper and periodical printing and publishing, the months of maximum and of minimum employment were the same, but the variations were much more pronounced in the first named branch.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for these months, are given for each state in Table 67.

Prevailing hours of labor.—In Table 16 the wage earners in the industry as a whole have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or a smaller number of hours.

Table 16AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY—
ALL BRANCHES COMBINED, 1909

STATE.	In establishments with prevailing hours—							
	Total.	48 and under.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.	Be- tween 60 and 72.	72 and over.
United States..	258,434	138,850	41,510	47,320	19,124	10,911	488	231
Alabama.....	1,117	447	32	351	99	188	.....	.....
Arkansas.....	981	419	49	182	87	237	3	4
California.....	7,556	5,485	1,038	778	119	119	17	.....
Colorado.....	2,366	1,759	77	173	308	39	10	.....
Connecticut.....	2,878	1,372	659	474	346	27	.....	.....
Dist. of Columbia..	1,565	1,259	161	61	83	.....	1	.....
Florida.....	905	408	39	314	98	43	7	1
Georgia.....	2,395	736	226	664	302	390	.....	20
Illinois.....	28,644	18,064	4,496	3,983	1,293	629	57	122
Indiana.....	6,756	3,912	600	1,002	628	706	3	5
Iowa.....	4,853	1,720	560	1,282	568	719	3	1
Kansas.....	3,232	1,264	184	720	608	442	8	6
Kentucky.....	3,135	1,074	804	779	180	283	6	10
Louisiana.....	1,544	773	196	356	119	91	1	9
Maine.....	1,651	573	142	690	208	36	.....	.....
Maryland.....	3,386	1,170	1,082	679	240	215	.....	.....
Massachusetts.....	17,532	11,404	1,853	2,911	1,342	20	.....	2
Michigan.....	7,219	2,718	833	2,334	833	500	1	.....
Minnesota.....	5,641	1,905	2,106	863	395	210	162	.....
Mississippi.....	736	337	7	117	24	247	3	1
Missouri.....	10,790	6,457	974	1,883	856	614	5	1
Montana.....	691	339	6	177	164	6	.....	.....
Nebraska.....	2,329	971	178	792	118	258	1	11
New Hampshire.....	677	180	76	132	205	84	.....	.....
New Jersey.....	5,451	3,251	1,141	640	315	79	25	.....
New York.....	63,120	34,754	15,083	8,512	4,081	670	18	2
North Carolina.....	1,376	527	70	308	137	297	37	.....
North Dakota.....	788	377	48	268	68	39	.....	.....
Ohio.....	15,756	6,888	1,951	4,670	1,485	744	18	.....
Oklahoma.....	1,998	1,122	58	323	32	163	.....	.....
Oregon.....	1,459	1,188	81	166	7	13	4	.....
Pennsylvania.....	24,696	14,412	3,297	4,267	1,965	730	25	.....
Rhode Island.....	1,454	529	525	98	278	21	3	.....
South Carolina.....	834	336	122	126	34	196	7	13
South Dakota.....	825	207	73	447	7	91	.....	.....
Tennessee.....	2,914	1,149	386	782	262	335	.....	.....
Texas.....	4,408	2,191	608	759	320	497	29	4
Utah.....	967	438	253	69	198	7	2	.....
Vermont.....	666	181	61	317	61	46	.....	.....
Virginia.....	2,555	726	341	1,105	178	197	6	2
Washington.....	2,624	1,878	294	324	37	86	2	3
West Virginia.....	1,255	601	35	479	41	99	.....	.....
Wisconsin.....	6,360	2,219	744	1,613	333	415	22	14

More than one-half (53.7 per cent) of the wage earners employed in the industry as a whole in 1909 were in establishments where the prevailing hours were 48 or less per week, 41.8 per cent were employed in establishments where the prevailing hours were between 48 and 60, and less than three-tenths of 1 per cent were employed in establishments where the prevailing hours were over 60. In all but 6 of the states for which separate data are shown, 48 hours or less per week constituted the most common time of employment. The exceptions were Minnesota, where the prevailing hours were between 48 and 54; Maine, South Dakota, Vermont, and Virginia, where they were 54; and New Hampshire, where they were between 54 and 60.

CHARACTER OF OWNERSHIP.

Table 17 presents statistics with respect to the character of ownership of establishments in the printing and publishing industry as a whole for the United States.

In 1909, of the total number of establishments, 22.8 per cent were under corporate ownership, as compared with 19.3 per cent in 1904. In 1909 the value of prod-

ucts of these establishments represented 70 per cent of the total for the industry, and in 1904, 66.7 per cent. Of the 1,046 establishments shown in 1909 as operating under forms of ownership other than individual, firm, or corporate, 38 were controlled by cooperative associations. Five of these belonged to the book and job printing branch of the industry and 33 to the newspaper and periodical branch. Of the remaining 1,008 establishments under miscellaneous or unclassified forms of ownership, 60 were classed under "book and job printing," 947 under "newspapers and periodicals," and 1 under "bookbinding and blank-book making." Most of these establishments are owned by various educational, religious, commercial, fraternal, and other similar organizations. The single "bookbinding and blank-book making" establishment under "other" form of ownership was the bindery owned by Middlesex County, Mass., which binds books exclusively for the office of the register of deeds and other county offices.

Table 17PRINTING AND PUBLISHING—ALL BRANCHES
COMBINED.

CHARACTER OF OWNERSHIP.	Number of establishments.				Value of products.			
	1909		1904		1909		1904	
	1909	1904	1909	1904	1909	1904	1909	1904
Total.....	31,445	27,793	\$737,876,087	\$552,473,353				
Individual.....	18,248	16,646	137,913,324	109,431,410				
Firm.....	4,967	5,260	66,502,891	69,366,483				
Corporation.....	7,184	5,354	516,400,736	368,729,392				
Other.....	1,046	533	17,059,136	4,946,068				
Per cent of total.....	100.0	100.0	100.0	100.0				
Individual.....	58.0	59.9	18.7	19.8				
Firm.....	15.8	18.9	9.0	12.6				
Corporation.....	22.8	19.3	70.0	66.7				
Other.....	3.4	1.9	2.3	0.9				

Table 18 gives statistics for establishments classified according to form of ownership for the 42 states and the District of Columbia employing an average of more than 500 wage earners in 1909. The 1,046 establishments under "other" forms of ownership have in this table been included with those under corporate ownership.

In 1909, 57,373 wage earners, or 22.2 per cent of the total, were employed in establishments under individual ownership; 29,227, or 11.3 per cent, in those under firm ownership; and 171,834, or 66.5 per cent, in those owned by corporations (including those under "other" ownership).

There was considerable variation among the states in the relative importance of the establishments under the three different forms of ownership. Thus, in New York, the leading state in the industry, establishments controlled by corporations constituted 33.2 per cent of the total number of establishments, gave employment to 72.4 per cent of the wage earners, and reported 75.4 per cent of the total value of products. In Mississippi, on the other hand, corporations controlled only 12.9 per cent of the establishments, and these establishments gave employment to but 19.7 per cent of the wage earners, and contributed only 24.7 per cent of the total value of products.

Table 18 PRINTING AND PUBLISHING—ALL BRANCHES COMBINED: 1909

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individu-als.	Firms.	Corpora-tions.	Individu-als.	Firms.	Corpora-tions.	Individuals.	Firms.	Corpora-tions.	Individuals.	Firms.	Corpora-tions.
United States	18,248	4,987	1,823	57,373	29,227	171,834	\$137,913,324	\$68,502,891	\$533,459,872	\$103,122,046	\$46,229,884	\$384,749,567
Alabama.....	163	52	59	410	137	570	683,299	229,582	1,855,366	548,473	179,810	1,373,971
Arkansas.....	194	66	35	412	193	378	697,547	398,252	986,566	545,670	294,601	706,471
California.....	709	194	337	1,885	719	4,952	6,762,762	1,812,749	16,456,368	5,142,337	1,398,227	12,164,010
Colorado.....	253	64	122	480	171	1,715	1,275,015	396,552	5,290,154	1,023,225	312,011	3,820,373
Connecticut.....	211	40	112	768	256	1,854	1,655,722	407,612	4,307,116	1,188,745	310,114	3,102,374
District of Columbia.....	81	18	57	447	98	1,020	865,107	215,341	3,819,044	649,235	183,525	2,971,850
Florida.....	109	20	45	273	66	566	476,367	103,628	1,285,853	374,391	77,218	980,030
Georgia.....	235	73	134	529	275	1,591	982,651	551,848	4,865,742	757,817	376,323	3,678,326
Illinois.....	1,352	423	833	3,764	2,524	22,356	10,252,467	5,610,653	71,383,970	7,889,922	4,118,519	50,558,676
Indiana.....	546	150	196	1,973	803	3,980	3,593,194	2,084,753	8,678,429	2,626,657	1,511,269	6,193,910
Iowa.....	702	208	200	1,685	729	2,439	3,399,193	1,429,501	7,299,963	2,616,071	1,086,901	5,138,588
Kansas.....	590	116	92	1,908	361	963	4,077,366	658,399	2,273,070	2,658,120	499,308	1,561,631
Kentucky.....	230	66	135	697	223	2,215	1,199,136	334,049	4,870,657	900,977	287,955	3,619,726
Louisiana.....	151	46	71	356	185	1,003	617,554	313,121	2,892,798	484,025	234,977	2,091,178
Maine.....	108	21	66	305	138	1,208	474,022	283,828	2,679,962	354,161	216,710	1,765,321
Maryland.....	209	62	100	824	728	1,834	1,529,883	2,023,281	4,806,615	1,134,455	1,329,550	3,431,386
Massachusetts.....	739	153	387	4,039	2,386	11,107	7,731,293	4,721,255	34,992,458	5,557,548	3,208,982	25,797,925
Michigan.....	598	177	270	1,805	734	4,680	3,198,694	1,407,300	12,742,347	2,405,930	985,368	9,022,517
Minnesota.....	584	159	207	1,297	545	3,799	2,852,132	1,300,754	11,829,326	2,114,132	987,967	8,784,668
Mississippi.....	159	37	29	439	152	145	721,905	262,614	323,085	558,451	187,748	261,312
Missouri.....	772	208	342	2,154	740	7,896	5,794,603	1,337,608	22,518,942	4,181,750	1,001,995	15,840,656
Montana.....	78	16	41	191	32	468	537,693	104,087	435,750	1,469,449	85,907	1,186,912
Nebraska.....	491	86	97	783	220	1,326	1,900,499	515,816	4,250,975	1,472,044	375,873	3,108,029
New Hampshire.....	104	17	22	294	77	306	468,207	124,601	537,839	100,447	100,447	433,118
New Jersey.....	442	91	151	1,345	486	3,620	2,679,391	982,232	8,671,077	1,946,114	720,267	6,194,168
New York.....	2,309	648	1,469	10,736	6,683	45,701	34,420,640	18,983,100	163,542,742	25,878,131	13,606,595	120,967,496
North Carolina.....	161	57	104	470	211	695	665,546	309,947	1,622,000	485,063	223,521	1,144,180
North Dakota.....	257	37	36	389	71	328	897,080	176,783	835,651	713,023	138,609	618,101
Ohio.....	829	283	543	2,745	1,615	11,396	6,510,373	3,232,528	31,914,405	4,891,752	2,306,498	22,554,702
Oklahoma.....	397	109	92	647	265	786	1,233,929	551,112	2,203,501	989,002	429,366	1,566,051
Oregon.....	200	47	77	375	138	946	1,108,857	371,464	3,560,202	906,158	288,325	2,742,627
Pennsylvania.....	1,445	435	581	6,029	4,101	14,566	14,139,129	8,453,297	47,991,753	10,199,621	6,064,175	31,567,634
Rhode Island.....	86	25	36	305	127	1,022	629,556	259,822	2,890,697	472,949	194,093	2,049,358
South Carolina.....	83	35	43	268	156	410	387,400	213,157	1,000,034	309,331	160,922	790,419
South Dakota.....	272	40	80	402	71	352	851,676	176,221	948,079	678,653	135,884	704,945
Tennessee.....	208	92	113	426	440	2,048	793,011	874,406	5,505,813	594,148	600,649	4,024,848
Texas.....	678	198	191	1,297	778	2,333	2,726,781	1,685,556	7,174,918	2,175,050	1,283,057	5,321,908
Utah.....	52	17	53	171	77	719	364,586	169,855	1,870,161	280,492	114,194	1,286,655
Vermont.....	74	16	25	263	98	305	353,777	156,152	528,914	263,837	117,351	407,845
Virginia.....	186	66	117	734	440	1,381	1,188,764	717,294	3,463,680	875,675	488,571	2,600,618
Washington.....	315	72	119	882	233	1,509	3,335,207	1,017,854	4,933,127	2,538,270	875,807	3,648,521
West Virginia.....	132	32	71	296	87	872	498,579	134,993	1,358,464	384,493	101,732	965,273
Wisconsin.....	501	125	207	1,301	486	3,573	2,189,286	814,780	8,856,578	1,651,255	592,961	6,230,372

¹ Includes 1,046 cooperative establishments reporting products valued at \$17,059,136.

SIZE OF ESTABLISHMENTS.

Classification by value of products.—Table 19 presents statistics for 1909 and 1904 for establishments in the industry as a whole, grouped according to the value of their products.

Table 19 PRINTING AND PUBLISHING—ALL BRANCHES COMBINED.

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	31,445	27,793	\$737,876,087	\$552,473,353
Less than \$5,000.....	16,524	15,824	40,128,238	37,040,171
\$5,000 and less than \$20,000.....	9,698	7,849	93,342,071	74,540,077
\$20,000 and less than \$100,000.....	3,976	3,186	168,339,719	133,756,198
\$100,000 and less than \$1,000,000.....	1,173	889	298,983,798	221,885,094
\$1,000,000 and over.....	74	45	137,082,261	85,251,813
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	52.6	56.9	5.4	6.7
\$5,000 and less than \$20,000.....	30.8	28.2	12.6	13.5
\$20,000 and less than \$100,000.....	12.6	11.5	22.8	24.2
\$100,000 and less than \$1,000,000.....	3.7	3.2	40.5	40.2
\$1,000,000 and over.....	0.2	0.2	18.6	15.4

In 1909 and 1904 less than 1 per cent of the establishments manufactured products valued at \$1,000,000 or over. While such establishments represented a very small proportion of the entire number of establishments at both censuses, they reported 18.6 per cent of the total value of products in 1909 and 15.4 per cent in 1904. Establishments manufacturing products valued at \$100,000 and less than \$1,000,000 were the most important class, as measured by value of products, reporting 40.5 per cent of the total production for the industry, this being a slight gain in proportion for the five-year period. Each group with products valued at less than \$100,000 showed a smaller proportion of the total value of products in 1909 than in 1904.

The small establishments—that is, those manufacturing products valued at less than \$20,000—constituted more than four-fifths (83.4 per cent) of the entire number of establishments in the industry in 1909, but the value of their products amounted to

only 18.1 per cent of the total. More than half (52.6 per cent) of the establishments reported a production of less than \$5,000 each in 1909.

The average value of products per establishment increased from \$19,878 in 1904 to \$23,466 in 1909, and the average value added by manufacture, as computed from the figures in Table 3, from \$14,750 to \$17,049. The average number of wage earners per establishment increased from 7.9 in 1904 to 8.2 in 1909.

Table 20 gives for each branch of the industry the average number of wage earners, value of products, and value added by manufacture per establishment in 1909. Lithographing leads in these averages by a large margin, the printing and publishing of music following in value of products and value added by manufacture.

BRANCH OF INDUSTRY.	AVERAGE PER ESTABLISHMENT: 1909		
	Average number of wage earners.	Value of products.	Value added by manufacture.
All branches combined	8	\$23,466	\$17,049
Printing and publishing, book and job	10	23,434	16,182
Printing and publishing, music	4	31,325	25,785
Printing and publishing, newspapers and periodicals	6	21,519	16,360
Bookbinding and blank-book making	19	30,116	19,082
Engraving, steel and copper plate, including plate printing	17	29,850	22,832
Lithographing	47	107,262	69,744

Classification by number of wage earners.—Table 21 classifies the establishments in 42 states and the District of Columbia according to the number of wage earners employed.

STATE.	PRINTING AND PUBLISHING—ALL BRANCHES COMBINED: 1909																		
	Total.		Establishments employing—																
			No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
Es-tab-lish-ments.	Wage earners (average number)	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States...	31,445	258,434	6,940	17,210	40,714	5,044	52,969	1,387	44,463	490	34,853	280	41,971	64	21,269	26	17,284	4	4,911
Alabama.....	274	1,117	47	185	460	32	322	9	265	1	70								
Arkansas.....	295	981	53	205	444	31	291	5	131				115						
California.....	1,240	7,556	343	648	1,505	180	1,961	42	1,347	16	1,113	10	1,369	1	261				
Colorado.....	439	2,366	118	246	540	57	595	9	296	5	326	4	609						
Connecticut.....	363	2,878	82	169	410	76	854	28	893	6	397	2	324						
Dist. of Columbia..	156	1,565	40	63	147	31	316	14	453	7	510	1	139						
Florida.....	174	905	29	112	248	23	230	7	192	3	235								
Georgia.....	442	2,395	104	253	592	61	612	17	554	5	360	2	277						
Illinois.....	2,608	28,644	708	1,218	2,948	433	4,686	144	4,505	54	3,784	34	5,372	11	3,289	6	4,060		
Indiana.....	892	6,756	140	512	1,236	187	1,880	33	1,109	13	822	6	863			1	846		
Iowa.....	1,110	4,853	158	777	1,778	135	1,378	34	1,060	3	217	3	420						
Kansas.....	798	3,232	154	544	1,195	79	798	14	432	6	416			1	393				
Kentucky.....	431	3,135	90	257	659	59	639	13	379	6	452	5	720	1	286				
Louisiana.....	268	1,544	48	164	388	40	432	13	444	2	156	1	124						
Maine.....	195	1,651	32	99	249	44	464	16	592	3	228	1	118						
Maryland.....	371	3,386	65	194	496	75	791	26	849	7	530	4	720						
Massachusetts.....	1,279	17,532	326	521	1,371	277	3,019	92	2,890	32	2,279	20	2,989	7	2,426	4	2,558		
Michigan.....	1,045	7,219	214	589	1,420	175	1,891	45	1,454	12	837	9	1,363	1	254				
Minnesota.....	950	5,641	195	584	1,268	119	1,194	35	1,166	11	775	5	718			1	520		
Mississippi.....	225	736	25	173	408	24	242	3	86										
Missouri.....	1,322	10,790	282	778	1,844	172	1,721	48	1,591	24	1,681	12	1,714	5	1,525	1	714		
Montana.....	135	691	24	92	207	11	101	5	178	3	205								
Nebraska.....	674	2,329	189	415	807	51	546	13	428	5	355	1	193						
New Hampshire.....	143	677	29	84	189	24	265	4	94	2	129								
New Jersey.....	684	5,451	150	366	966	125	1,193	25	795	9	607	7	1,219	2	671				
New York.....	4,426	63,120	1,261	1,771	4,638	885	9,574	286	9,231	111	8,089	72	10,884	25	8,543	11	7,250	4	4,911
North Carolina.....	322	1,378	47	212	527	57	605	4	112	2	132								
North Dakota.....	330	788	60	248	431	17	152	5	205										
Ohio.....	1,655	15,756	326	817	2,060	351	3,714	101	3,161	38	2,632	18	2,562	3	1,112	1	515		
Oklahoma.....	598	1,698	100	442	863	45	432	9	281	2	122								
Oregon.....	324	1,459	72	195	416	49	497	4	118	3	208	1	220						
Pennsylvania.....	2,461	24,696	548	1,211	3,066	474	5,012	137	4,411	48	3,467	36	5,663	6	2,256	1	821		
Rhode Island.....	147	1,454	29	75	180	32	381	5	211	2	138	4	544						
South Carolina.....	161	834	19	105	223	32	287	3	107	2	147								
South Dakota.....	392	825	72	300	538	16	178	4	109										
Tennessee.....	413	2,914	111	229	536	41	394	19	629	8	588	4	514	1	253				
Texas.....	1,067	4,408	199	725	1,590	109	1,107	23	641	7	495	4	575						
Utah.....	122	967	25	65	164	23	217	6	218	1	68	2	300						
Vermont.....	115	666	18	62	157	27	257	8	252										
Virginia.....	369	2,555	62	219	546	59	644	18	550	10	693	1	122						
Washington.....	506	2,624	102	312	659	73	762	11	412	6	494	2	297						
West Virginia.....	235	1,255	30	161	390	34	356	8	273			2	236						
Wisconsin.....	833	5,360	144	500	1,139	136	1,379	33	1,116	14	1,038	6	688						

Of the 31,445 establishments reported in 1909, 22.1 per cent employed no wage earners, 54.7 per cent employed from 1 to 5 wage earners each, 16 per cent, from 6 to 20, and only 7.2 per cent, more than 20. There were only 490 establishments which employed from 51

to 100 wage earners each, 344 that employed from 101 to 500 each, and 26 that employed from 501 to 1,000. Four establishments, all in New York, reported more than 1,000 wage earners each. Of the total number of wage earners, 36.3 per cent were reported by estab-

lishments employing from 1 to 20, 17.2 per cent by establishments employing from 21 to 50, 13.5 per cent by establishments employing from 51 to 100, 24.5 per cent by establishments employing from 101 to 500, 6.7 per cent by establishments employing from 501 to 1,000, and 1.9 per cent by establishments employing more than 1,000.

EXPENSES.

As stated in the Introduction, the census figures for expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total reported expenses in the industry as a whole in 1909 to have been \$619,158,045, distributed as follows: Cost of materials, \$201,774,590, or 32.6 per cent; wages, \$164,628,180, or 26.6 per cent; salaries, \$103,458,251, or 16.7 per cent; and miscellaneous expenses, \$149,297,024, or 24.1 per cent. This latter item includes rent payments amounting to \$13,648,406; taxes, \$2,699,575; and payments for contract work, \$36,384,359. The remainder, besides covering advertising expenses, traveling expenses, repairs, insurance, etc., includes various special items peculiar to the publishing industry, such as royalties and other payments to authors and contributors, and costs of news service. It is because of these special items that the proportion for miscellaneous expenses is higher in this industry than in most other industries. Salaries, in this industry, represented a larger proportion of total expenses than in any other of the 43 industries of the country reporting products to the value of \$100,000,000 or more, and the proportion represented by materials was smaller than in any other of these industries with the exception of distilled liquors and malt liquors.

The percentages of the total reported expenses represented by the several classes are shown for each of the six branches of the industry in Table 22.

Table 22

BRANCH OF INDUSTRY.	PERCENTAGE OF TOTAL REPORTED EXPENSES REPRESENTED BY—			
	Cost of materials.	Salaries.	Wages.	Miscellaneous expenses.
All branches combined.....	32.6	16.7	26.6	24.1
Printing and publishing, book and job..	36.5	11.8	31.3	20.4
Printing and publishing, music.....	21.9	19.7	9.8	48.7
Printing and publishing, newspapers and periodicals.....	28.9	20.6	22.1	28.3
Bookbinding and blank-book making...	42.2	11.5	35.1	11.1
Engraving, steel and copper plate, including plate printing.....	28.1	14.6	43.0	14.2
Lithographing.....	39.4	12.9	33.7	14.0

The high percentage represented by miscellaneous expenses in establishments engaged in the music printing and publishing branch of the industry is presumably due to the fact that royalty payments and payments for contract work form a larger proportion of the total payments than in the other branches. The proportion for miscellaneous expenses shown for establishments engaged in printing and publishing newspapers and periodicals was also high for the reason already stated in the case of establishments in the music printing and publishing branch of the industry.

Naturally there are variations among the several states in the distribution of expenses. Table 23 shows the percentages formed by the several items of expense for 14 of the principal states for 1909; the absolute amounts are shown in Table 67. The figures relate to all six branches of the industry combined.

Table 23

STATE.	PER CENT OF TOTAL EXPENSES FOR THE PRINTING AND PUBLISHING INDUSTRY—ALL BRANCHES COMBINED: 1909			
	Cost of materials.	Salaries.	Wages.	Miscellaneous expenses.
United States.....	32.6	16.7	26.6	24.1
California.....	30.1	18.2	30.6	21.1
Illinois.....	33.4	16.7	24.9	25.0
Indiana.....	34.6	14.2	30.3	21.0
Iowa.....	34.8	16.9	27.4	20.9
Massachusetts.....	31.5	14.8	28.5	25.3
Michigan.....	34.7	18.0	28.2	19.1
Minnesota.....	31.7	17.5	27.2	23.7
Missouri.....	34.3	16.9	26.3	22.5
New Jersey.....	35.5	13.4	37.1	14.0
New York.....	30.0	17.7	23.1	29.2
Ohio.....	34.4	15.8	27.1	22.7
Pennsylvania.....	39.0	15.1	24.6	21.3
Texas.....	30.4	18.0	30.2	21.5
Wisconsin.....	34.3	15.3	29.5	20.9

For New Jersey, miscellaneous expenses represented only 14 per cent of the total expenses, the lowest proportion shown by any state for which figures are given, while wages formed a higher proportion than in any other state. In this state the bookbinding and blank-book making, engraving, and lithographing branches of the industry are of relatively greater consequence than in some of the other states, and in these branches miscellaneous expenses are relatively small and wage payments relatively large. For New York, where the publishing business is particularly important, the proportion represented by miscellaneous expenses was exceptionally large, owing to payments for contract work and other expenses peculiar to the publishing business.

ENGINES, POWER, AND FUEL.

Engines and power.—Table 3 shows that the total amount of power used increased from 67,453 horsepower in 1889 to 297,763 horsepower in 1909. Table 24 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

Table 24 PRINTING AND PUBLISHING—ALL BRANCHES COMBINED.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	62,048	29,805	6,957	297,763	166,380	119,775	100.0	100.0	100.0
Owned.....	9,460	8,826	6,957	93,806	83,253	74,065	31.5	50.0	61.8
Steam.....	1,090	1,765	2,741	50,240	54,897	54,723	19.9	33.0	45.7
Gas.....	7,755	6,207	8,714	32,152	24,964	15,115	10.8	15.0	12.6
Water wheels.....	62	87	502	600	798	2,821	0.2	0.5	2.4
Water motors.....	553	767	(¹)	1,720	2,534	(¹)	0.6	1.5	(¹)
Other.....				94	60	1,406	(²)	(²)	1.2
Rented.....	52,588	20,979	(¹)	203,957	83,127	45,710	68.5	50.0	38.2
Electric.....	52,588	20,979	(¹)	197,692	75,479	33,582	66.4	45.4	28.0
Other.....				6,265	7,648	12,128	2.1	4.6	10.1
Electric motors.....	60,731	24,866	852	229,312	93,219	41,413	100.0	100.0	100.0
Run by current generated by establishment.....	8,143	3,687	852	31,620	17,740	7,831	13.8	19.0	18.9
Run by rented power.....	52,588	20,979	(¹)	197,692	75,479	33,582	86.2	81.0	81.1

¹ Not reported. ² Less than one-tenth of 1 per cent.

Printing and publishing is one of the few important industries in which rented electric current is used to a greater extent than steam as a source of power, and this condition arose during the decade 1899-1909. In 1899 steam power predominated with a total of 54,723 horsepower, but its gain for the decade was only 8.3 per cent. On the other hand, the amount of rented electric power in 1899 was only 33,582 horsepower, but this power increased 124.8 per cent during the following five years, surpassing steam power in amount in 1904. During the next five years such power increased 161.9 per cent, the total horsepower in 1909 being 197,692, and constituting practically two-thirds of all the primary power reported for the industry. There was also a decided increase during the decade in the number and horsepower of electric motors operated by current generated in the same establishment. Table 25 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in the industry as a whole in 42 states and the District of Columbia.

Table 25 PRINTING AND PUBLISHING—ALL BRANCHES COMBINED: 1909

STATE.	Primary horsepower.										Electric horsepower.		Fuel used.				
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States ..	21,871	297,763	93,806	59,240	32,152	2,320	94	197,692	6,265	229,312	31,620	154,932	348,698	2,895	19,834	41,265	1,633,888
Alabama.....	178	1,092	308	120	173	15		784		788	4	2	1,522	10	343	334	1,799
Arkansas.....	180	846	334	72	262			512		513	1	49	686	27	601	621	4,257
California.....	890	7,674	513	100	346	67		6,946	215	6,951	5	98	751		482	3,018	33,586
Colorado.....	276	2,045	308	115	158	35		1,737		1,862	125	31	4,936	17	52	233	6,248
Connecticut.....	270	3,425	1,051	724	258	69		2,115	259	2,227	112	3,496	3,119		68	202	8,540
District of Columbia.....	95	1,703	817	686	131			886		1,215	329	566	2,105			3	7,094
Florida.....	120	794	239	22	214	3		551	4	551		231	46		27	495	2,421
Georgia.....	269	2,008	439	78	345	16		1,568	1	1,568		105	2,037	31	140	697	4,574
Illinois.....	1,756	26,975	9,219	7,361	1,736	47	75	17,334	422	20,632	3,298	2,317	83,242	209	88	271	69,461
Indiana.....	687	17,868	2,915	1,498	1,373	32	12	14,947	6	16,273	1,326	1,035	19,520	159	524	1,552	36,613
Iowa.....	864	5,527	2,144	556	1,545	42	1	3,372	11	3,378	6	460	13,948	114	242	2,766	23,165
Kansas.....	548	4,868	1,297	159	1,114	24		3,566	5	3,702	136	93	3,405	6	19	1,138	71,209
Kentucky.....	291	2,945	745	237	477	31		2,200		2,275	75	30	6,021		70	625	22,901
Louisiana.....	163	1,494	370	160	203	7		1,124		1,125	1	1	610		38	477	7,533
Maine.....	180	1,565	678	383	128	67		882	105	1,024	142	1,154	1,192	65	231	323	4,837
Maryland.....	267	3,694	1,974	1,515	444	15		1,661	59	2,208	547	2,224	5,504		33	223	16,267
Massachusetts.....	923	47,629	6,678	5,752	861	65		40,353	598	44,904	4,551	9,408	22,509	131	125	221	86,614
Michigan.....	813	7,651	2,501	1,398	1,087	36		5,071	79	5,614	543	1,557	12,807	297	1,838	1,470	23,063
Minnesota.....	653	5,765	1,504	710	785	9		4,257	4	4,446	189	1,874	6,879	56	1,774	1,147	17,053
Mississippi.....	124	496	194	4	190			302		302		1	484	23	62	486	652
Missouri.....	874	10,472	3,538	2,261	1,253	24		6,934		8,303	1,869	2,106	28,071	30	1,494	3,442	70,006
Montana.....	94	879	228	54	109	65		451		451		195	640		254	264	1,677
Nebraska.....	453	2,552	1,044	249	786	9		1,403	105	1,428	25	324	6,351	114	10	1,198	5,535
New Hampshire.....	110	1,865	139	42	49	48		1,701	25	1,718	17	623	214	7	201	60	1,237
New Jersey.....	504	5,636	2,750	2,161	635	54		2,714	172	3,681	967	8,518	5,624	62	25	276	19,200
New York.....	2,883	53,973	17,413	13,586	3,073	752	2	33,694	2,966	41,571	7,977	76,871	20,814	244	629	1,840	235,216
North Carolina.....	208	1,119	422	146	268	8		689	8	689		215	1,555	22	1,035	640	2,731
North Dakota.....	220	948	528	4	524			417	3	417		564	1,434		59	943	1,768
Ohio.....	1,302	18,417	9,082	5,537	3,473	72		9,140	195	11,873	2,733	662	40,242	26	96	1,118	225,115
Oklahoma.....	393	1,664	658	94	564			1,004	2	1,004		35	872	14	244	835	38,112
Oregon.....	227	1,927	178	64	73	41		1,749		1,749		27	460		1,502	3,877	4,826
Pennsylvania.....	1,796	25,839	13,522	8,368	4,885	269		11,608	709	16,225	4,817	36,151	11,718	17	93	1,026	408,160
Rhode Island.....	110	1,944	1,130	1,080	43	7		806	8	1,138	332	406	2,526	288	34	30	5,329
South Carolina.....	116	603	189	35	154			414		418	4	200	499		208	329	494
South Dakota.....	240	931	628	5	616	7		303		304	1	632	1,490	23	318	960	2,241
Tennessee.....	227	2,965	1,494	1,251	215	28		1,461	10	2,128	667	21	11,699	375	198	621	6,681
Texas.....	684	4,392	1,480	525	951		4	2,902	10	3,203	301	285	3,174	75	647	2,728	8,931
Utah.....	78	1,357	836	800	35			521		521		684	163		33	39	4,637
Vermont.....	97	625	173	44	64	65		452		452		577	80	1	207	67	3,012
Virginia.....	252	2,210	518	262	225	31		1,692		1,692		770	3,996	11	380	326	5,774
Washington.....	371	2,232	355	95	161	99		1,874	3	1,878	4	123	1,136	10	1,700	309	48,156
West Virginia.....	171	1,560	973	58	851	64		678	9	741	163	24	750		27	222	65,389
Wisconsin.....	634	5,293	1,968	822	1,075	71		3,053	272	3,442	389	1,607	7,888	431	3,035	1,042	18,071
All other states.....	305	2,496	432	47	360	25		2,064		2,065	1	364	1,814		648	701	3,271

In 1909 New York, Massachusetts, Illinois, Pennsylvania, Ohio, and Indiana together reported 190,701 horsepower, or 64 per cent of the aggregate for the industry.

Electricity constituted the most important source of primary power in all but five of the states given in the table—Rhode Island and Utah, in which steam engines furnished the major portion of the power used, and North Dakota, South Dakota, and West Virginia, in which the use of gas engines predominated. Massachusetts utilized rented electric power to a greater extent than any other state, re-

porting 40,353 horsepower, and New York was second with 33,594 horsepower.

Fuel consumed.—Bituminous coal was the principal kind of fuel used, 348,698 short tons being consumed during 1909. New York and Pennsylvania, however, consumed much larger quantities of anthracite than of bituminous coal. Considerable quantities of oil and natural gas were used in some states. The greatest quantities of gas were reported by Pennsylvania, New York, and Ohio, in the order named, the total for these states amounting to 868,491,000 feet, or 53.2 per cent of the total for the United States.

SPECIAL STATISTICS RELATING TO PRODUCTS.

SUMMARY FOR THE INDUSTRY AS A WHOLE.

Table 26 shows statistics for all products of the printing and publishing industry as a whole for the United States for 1909, 1904, and 1899.

Table 26 PRODUCT.	1909	1904	1899
Total value.....	\$737,876,087	\$552,473,353	\$395,186,829
Publications:			
Newspapers and periodicals.....	337,596,288	256,816,282	175,789,610
Subscriptions and sales.....	135,063,043	111,298,691	79,928,483
Advertising.....	202,533,245	145,517,591	95,861,127
Newspapers.....	232,993,094	(¹)	(¹)
Subscriptions and sales.....	84,438,702		
Advertising.....	148,554,392		
Periodicals.....	104,603,194	(¹)	(¹)
Subscriptions and sales.....	50,624,341		
Advertising.....	53,978,853		
Ready prints, patent insides and outsides.....	2,293,077	(¹)	
Books and pamphlets—			
Published, or printed and pub- lished.....	62,930,394	53,312,492	
Printed for publication by others.....	10,209,509	(¹)	
Sheet music and books of music—			
Published, or printed and pub- lished.....	5,510,698	4,673,685	219,397,019
Printed for publication by others.....	1,000,966	(¹)	
Other products for sale and in execution of orders:			
Job printing.....	207,940,227	149,262,070	
Bookbinding and blank books.....	50,552,808	40,788,768	
Electrotyping, engraving, and litho- graphing.....	47,956,979	35,018,234	
All other products.....	11,885,141	12,601,822	

¹ Not reported separately.

SUMMARY FOR THE PRINTING AND PUBLISHING INDUSTRY PROPER.

While the Bureau of the Census recognizes six branches in the printing and publishing industry, the

business of actual publishing is restricted to three of these, namely, book publishing and job printing, music printing and publishing, and newspapers and periodicals. In each of these branches, the receipts from publications constitute an important share of the value of products; and, naturally, their aggregate value of products represents by far the larger part (89.8 per cent) of the value of products of the industry as a whole. These three branches, then, may be called the printing and publishing industry proper, and at the census of 1909 a supplemental schedule calling for more detailed information than at the two preceding censuses was used in the enumeration of establishments included in these branches. With the exception of Tables 66 and 67 (in which are presented detailed statistics by states for the industry as a whole) the remainder of this bulletin is devoted to the presentation of special statistics secured by this supplemental schedule.

Table 27 shows, by states and geographic divisions, statistics for the value of the several classes of products or receipts of the three branches of book and job printing, printing and publishing of music, and newspapers and periodicals, for 1909. It should be distinctly understood that, for some of the classes of products, large amounts were reported by other branches of the industry not included in the table.

PRINTING AND PUBLISHING, BOOK AND JOB, MUSIC, AND NEWSPAPERS

Table 27		Number of establishments.	Total value.	NEWSPAPERS.			PERIODICALS (OTHER THAN NEWSPAPERS).		
DIVISION AND STATE.				Printed and published or published by establishment reporting.	Printed for publication by others.	Printed and published or published by establishment reporting.		Printed for publication by others.	
						Subscriptions and sales.	Advertising.		Subscriptions and sales.	Advertising.
1	United States.....	29,757	\$662,591,959	\$84,436,702	\$148,554,392	\$1,699,141	\$50,624,341	\$53,876,853	\$7,420,479
2	New England.....	2,061	55,946,214	7,730,096	12,693,729	62,068	4,329,011	2,947,521	1,079,209
3	Maine.....	187	3,259,743	441,959	654,542	4,647	579,386	568,099	816
4	New Hampshire.....	140	1,116,837	239,908	314,626	7,120	6,875	6,808	2,668
5	Vermont.....	112	1,029,155	192,845	266,886	500	15,758	4,668	13,480
6	Massachusetts.....	1,149	41,000,665	5,530,580	8,605,946	38,956	3,644,377	2,185,041	1,021,820
7	Rhode Island.....	135	3,434,616	417,029	1,075,404	.....	26,404	96,749	6,125
8	Connecticut.....	338	6,105,198	907,775	1,676,525	10,845	56,211	88,156	34,300
9	Middle Atlantic.....	6,757	257,972,204	24,903,446	44,522,232	632,663	29,504,230	31,689,196	3,964,801
10	New York.....	3,845	184,642,958	16,114,038	27,225,981	504,216	23,041,075	24,655,093	3,629,012
11	New Jersey.....	641	9,723,430	1,147,614	3,288,563	17,133	181,722	109,584	12,025
12	Pennsylvania.....	2,271	63,605,816	7,641,794	14,007,688	111,314	6,281,433	6,824,519	323,764
13	East North Central.....	6,661	155,871,806	20,153,327	32,084,332	125,029	9,872,923	10,476,442	1,078,315
14	Ohio.....	1,569	36,825,105	4,655,491	8,455,767	19,675	2,730,293	2,136,214	337,478
15	Indiana.....	872	13,873,825	2,371,865	3,364,377	6,170	554,456	433,900	27,341
16	Illinois.....	2,454	80,214,769	8,936,703	13,719,670	38,236	5,722,207	6,893,257	554,654
17	Michigan.....	1,000	15,075,464	2,241,533	4,168,537	20,295	527,735	561,260	141,778
18	Wisconsin.....	786	9,882,643	1,947,753	2,375,981	40,753	338,232	451,811	17,164
19	West North Central.....	5,456	72,353,149	11,536,738	20,019,863	231,405	3,002,894	4,363,757	328,060
20	Minnesota.....	916	15,298,616	1,990,481	4,073,857	49,287	686,977	1,056,938	80,119
21	Iowa.....	1,094	11,784,391	2,176,339	3,076,489	18,506	546,272	962,331	108,748
22	Missouri.....	1,267	28,061,861	3,926,825	7,733,436	15,381	1,067,171	1,528,856	113,776
23	North Dakota.....	330	1,909,514	395,278	679,702	2,873	19,070	6,185	816
24	South Dakota.....	391	1,974,951	436,009	604,206	3,300	54,104	128,075	3,830
25	Nebraska.....	670	6,626,595	1,288,027	2,059,105	114,979	183,369	277,165	7,962
26	Kansas.....	788	6,697,221	1,323,776	1,742,616	27,279	420,031	426,159	14,809
27	South Atlantic.....	2,202	31,464,449	4,649,670	9,332,074	118,151	1,194,945	1,292,739	320,331
28	Delaware.....	47	468,790	65,217	169,714	536	7,796	6,480	232
29	Maryland.....	332	7,311,675	835,249	2,091,989	20,294	82,112	319,173	65,668
30	District of Columbia.....	136	4,449,461	612,345	1,596,119	3,830	469,775	189,145	84,664
31	Virginia.....	359	5,035,626	549,195	1,090,105	13,804	205,608	87,418	52,572
32	West Virginia.....	233	1,946,705	392,338	653,630	1,920	18,884	9,053	7,333
33	North Carolina.....	322	2,497,493	551,416	552,708	26,947	147,008	116,433	12,867
34	South Carolina.....	160	1,588,696	380,308	471,072	2,000	45,265	21,150	11,222
35	Georgia.....	439	6,300,155	945,529	1,953,166	44,410	201,177	525,319	72,985
36	Florida.....	174	1,865,848	317,973	723,571	17,320	17,320	18,568	12,988
37	East South Central.....	1,321	16,926,650	2,774,838	4,736,961	70,042	1,055,526	647,859	178,658
38	Kentucky.....	419	5,755,274	912,874	1,501,955	20,668	247,039	249,066	64,261
39	Tennessee.....	409	7,136,330	980,340	1,793,250	5,702	753,740	256,080	102,403
40	Alabama.....	269	2,730,195	600,978	1,016,105	3,608	39,869	36,894	4,934
41	Mississippi.....	224	1,304,751	280,646	425,651	40,064	14,878	5,819	5,060
42	West South Central.....	2,205	21,118,729	3,861,511	6,708,825	45,168	402,133	638,366	67,890
43	Arkansas.....	295	2,082,365	414,992	575,232	9,840	56,313	19,626	3,803
44	Louisiana.....	254	3,614,821	777,116	1,142,746	1,054	62,395	140,247	33,862
45	Oklahoma.....	594	3,897,334	669,017	1,412,693	18,827	37,781	50,144	9,045
46	Texas.....	1,062	11,524,209	2,090,386	3,578,154	15,447	245,644	428,349	20,980
47	Mountain.....	1,088	14,447,597	2,771,913	5,273,504	32,994	286,318	352,260	29,880
48	Montana.....	133	2,099,029	462,557	875,761	3,500	14,721	24,211	1,170
49	Idaho.....	131	1,145,033	236,579	454,361	1,500	2,125	5,125	500
50	Wyoming.....	65	489,844	122,740	204,210	.....	7,772	4,058	.....
51	Colorado.....	432	6,702,987	1,158,671	2,268,918	23,301	190,280	268,136	22,710
52	New Mexico.....	92	581,874	127,296	232,224	1,853	6,132	1,800	.....
53	Arizona.....	64	784,487	147,781	365,522	1,240	5,654	8,102	5,500
54	Utah.....	117	2,125,400	398,174	635,851	.....	58,634	40,828	.....
55	Nevada.....	54	519,243	118,115	236,657	1,600	.....	.....	.....
56	Pacific.....	1,886	36,491,261	6,057,265	13,283,072	283,621	877,261	1,750,713	375,535
57	Washington.....	499	8,980,546	1,449,317	3,899,456	222,186	95,108	256,088	19,756
58	Oregon.....	310	4,833,098	746,227	1,660,435	4,311	218,675	324,656	143,321
59	California.....	1,187	22,677,617	3,861,721	7,723,181	57,124	663,478	1,169,969	212,458

¹ In addition, printing and publishing, etc., to the value of \$2,942,282 was reported by establishments in other industries.

AND PERIODICALS—VALUE OF PRODUCTS OR RECEIPTS, BY CLASSES: 1909.

	BOOKS AND PAMPHLETS.		SHEET MUSIC AND BOOKS OF MUSIC.		Engravings, lithographs, etc., printed for publication by others.	Ready prints (patent insides and outsides), for publication by others.	Stereotyped plates, for use by others.	Job printing (not elsewhere included).	Bookbinding.	Blank books.	Electrotyping, engraving, etc.	All other products.
	Printed and published or published by establishment reporting.	Printed for publication by others.	Printed and published or published by establishment reporting.	Printed for publication by others.								
1	\$62,930,394	\$10,209,509	\$5,510,698	\$1,000,966	\$3,355,593	\$2,293,077	\$430,538	\$135,134,478	\$13,603,567	\$5,206,825	\$4,415,267	\$11,885,141
2	5,951,850	1,775,579	819,232	151,874	78,936	68,616	20,513	15,993,407	1,408,945	152,506	438,323	543,800
3	98,415	33,274	.....	.....	30,675	.....	.....	769,773	15,931	5,000	8,877	48,349
4	10,214	14,454	1,200	.....	.....	.....	.....	472,676	24,174	785	7,646	7,683
5	48,422	8,379	.....	.....	52	.....	.....	459,314	9,320	7,218	.....	1,513
6	5,596,317	1,532,115	618,032	151,574	29,792	68,616	15,263	10,240,035	1,220,785	19,183	300,901	181,332
7	33,099	14,041	.....	300	.....	.....	.....	1,451,216	28,829	60,633	8,688	215,699
8	165,383	172,316	.....	.....	18,417	.....	.....	2,600,393	109,906	59,688	112,811	89,224
9	37,626,122	4,959,413	3,289,685	610,241	1,235,345	506,936	23,331	61,929,568	4,921,274	1,192,632	860,199	5,700,882
10	31,666,569	3,810,337	2,678,706	480,663	992,070	469,084	10,560	39,712,376	3,697,011	696,022	651,149	4,608,996
11	285,253	105,275	5,300	.....	200	.....	.....	4,196,585	194,131	49,972	31,081	96,143
12	5,674,300	1,043,801	605,689	129,578	243,075	37,852	9,922	18,020,605	1,030,132	446,638	177,969	995,743
13	13,741,083	1,714,956	1,346,060	208,913	751,526	558,091	214,554	54,278,225	3,522,899	1,283,547	1,860,447	2,600,337
14	3,352,861	566,080	395,404	83,895	330,826	103,604	66,492	11,834,991	523,451	337,390	394,271	501,072
15	865,443	171,717	16,311	1,000	30,186	62,905	16,396	4,852,095	417,972	215,997	296,650	169,044
16	8,768,936	630,130	917,713	44,042	201,324	249,920	123,336	28,009,858	2,281,171	635,839	938,139	1,549,734
17	563,857	98,207	9,079	79,966	151,527	33,794	8,205	5,824,069	193,282	74,043	181,763	196,534
18	189,966	248,872	7,553	10	37,663	108,868	125	3,757,212	106,823	20,278	49,624	183,953
19	2,688,168	524,319	120,232	19,888	674,378	645,376	120,108	23,987,787	1,046,644	1,382,633	332,984	1,316,118
20	1,433,132	101,415	19,807	10,000	202,612	102,761	19,014	4,842,133	233,016	190,951	39,213	166,905
21	242,412	42,602	24,459	.....	106,548	155,155	22,116	3,525,260	219,512	211,748	53,779	294,065
22	907,436	193,853	65,492	7,010	294,686	232,628	55,246	10,086,390	319,843	632,845	198,791	614,144
23	3,072	22,690	.....	.....	.....	13,471	1,022	676,752	27,315	33,329	.....	28,138
24	7,480	300	.....	.....	.....	15,177	2,101	651,790	14,566	25,140	.....	28,873
25	18,189	20,860	9,924	2,878	70,532	77,088	11,556	2,064,195	130,618	200,135	520	80,493
26	68,447	142,599	550	.....	49,095	.....	9,053	2,141,267	101,774	79,365	40,681	103,500
27	1,550,243	758,754	63,814	.....	130,347	125,943	3,415	10,288,203	662,467	285,847	211,772	477,834
28	25,230	225	.....	.....	2,000	.....	.....	177,938	4,798	2,360	6,154	80
29	451,428	197,475	1,000	.....	1,250	29,578	510	2,576,528	232,549	60,645	173,837	172,490
30	193,755	119,433	9,505	.....	7,611	.....	.....	1,102,569	417	24	3,400	56,919
31	632,765	162,392	.....	.....	2,500	13,700	1,700	1,965,240	159,764	19,839	16,637	62,387
32	1,100	26,135	.....	.....	61,981	400	.....	645,123	56,238	33,169	100	39,301
33	30,123	128,884	.....	.....	425	31,208	.....	786,809	25,748	52,943	.....	3,814
34	24,670	7,460	.....	.....	280	3,975	.....	552,208	15,420	31,922	4,297	14,447
35	190,922	84,800	53,309	.....	54,300	47,022	.....	1,777,944	152,183	83,915	7,347	105,827
36	250	31,950	.....	.....	.....	.....	1,205	700,844	15,350	1,000	.....	22,469
37	243,875	186,356	28,884	.....	155,408	93,169	6,898	5,325,012	417,996	225,820	123,415	147,833
38	53,727	14,121	.....	.....	61,802	.....	10	2,224,163	240,258	45,361	64,855	55,114
39	187,747	86,365	28,884	.....	63,172	49,983	6,115	2,445,160	101,709	144,655	53,500	77,465
40	1,476	50,066	.....	.....	30,434	30,408	773	808,217	64,881	31,214	.....	9,338
41	925	35,804	.....	.....	.....	12,778	.....	456,472	11,148	4,590	5,000	5,916
42	325,303	75,598	37,981	10,000	137,883	138,523	25,391	6,943,504	336,858	400,360	282,440	683,395
43	2,120	1,679	3,600	.....	25,000	32,689	3,559	823,382	18,290	34,847	8,406	48,987
44	16,872	17,404	.....	.....	38,336	95	6	1,162,096	88,096	56,980	4,000	73,516
45	11,106	5,100	.....	.....	.....	52,409	11,139	1,294,072	28,957	44,419	.....	252,025
46	295,205	51,415	34,381	10,000	74,347	51,330	10,687	3,663,954	201,515	264,114	270,034	308,267
47	137,231	50,461	3,950	.....	66,205	77,238	8,521	4,433,687	465,471	88,208	178,476	192,261
48	650	8,633	.....	.....	.....	.....	.....	596,781	75,962	12,552	5,604	16,927
49	700	16,145	.....	.....	1,040	860	.....	393,852	7,945	12,106	7,010	5,185
50	.....	.....	.....	.....	.....	.....	.....	143,539	650	775	.....	400
51	97,901	22,300	3,950	.....	65,165	52,063	5,252	2,062,445	264,115	3,713	157,054	37,013
52	8,067	220	.....	.....	.....	.....	.....	200,009	.....	3,873	.....	400
53	.....	200	.....	.....	.....	.....	.....	227,540	5,737	11,474	5,737	.....
54	29,913	2,963	.....	.....	.....	24,315	3,269	650,274	103,062	43,715	2,070	132,332
55	.....	.....	.....	.....	.....	.....	.....	154,247	8,000	.....	600	24
56	674,519	184,073	850	50	125,765	80,188	7,807	11,345,085	820,213	185,373	127,212	222,661
57	78,315	12,864	.....	.....	26,739	25,935	50	2,578,816	173,707	108,638	13,960	19,611
58	3,233	13,848	.....	.....	50,260	19,037	.....	1,423,868	134,778	4,708	17,108	68,633
59	592,971	137,361	850	50	48,766	35,214	7,757	7,342,401	611,728	82,027	96,144	134,417

The geographic divisions leading in 1909 in receipts from subscriptions and sales of newspapers and from newspaper advertising also, were the Middle Atlantic, the East North Central, and the West North Central, in the order named. The states leading in receipts for newspaper advertising were New York, Pennsylvania, and Illinois; but Illinois exceeded Pennsylvania in receipts for subscriptions and sales, New York being first.

In receipts for subscriptions and sales of periodicals other than newspapers, the Middle Atlantic division ranked first, followed by the East North Central and New England divisions. In receipts for periodical advertising, however, the West North Central outranked the New England division. Among the individual states New York was first in receipts for subscriptions and sales, Pennsylvania second, and Illinois third; in receipts for advertising Illinois displaced Pennsylvania by a slight margin.

The business of publishing music is more concentrated geographically than any of the other branches of the printing and publishing industry. Of the total value of music published or printed and published, as shown in this combined table, New York alone reported nearly one-half.

In amount received for books and pamphlets, published or printed and published, the Middle Atlantic division was first, the East North Central division second, and New England third. New York, Illinois, Pennsylvania, and Massachusetts were the leading states in value of output of these products.

The Middle Atlantic division led in receipts from job printing, the East North Central following, with the West North Central third. New York, Illinois, and Pennsylvania were the leading states in the order named. Under the heading "job printing, not elsewhere included" the statistics for book publishing and contract printing include separate reports for the printing departments of certain large mercantile establishments and of manufacturing concerns engaged primarily in industries other than printing and publishing. Such establishments conduct their printing departments as adjuncts to their regular business and not as a source of direct profit.

BOOK AND JOB PRINTING AND PUBLISHING.

Table 28 shows, by states, statistics for the several classes of products of book publishing and job printing establishments for 1909. Such statistics are not available for censuses previous to 1909.

Table 28

PRINTING AND PUBLISHING, BOOK AND JOB—VALUE OF PRODUCTS: 1909

STATE.	Total.	Newspapers and periodicals, printed for publication by others.	Books and pamphlets.		Music, engravings, lithographs, ready prints, and stereotyped plates, printed and published only, or printed for publication by others.	Job printing (not elsewhere included).	Book-binding.	Blank books.	Electrotyping, engraving, etc.	All other products.
			Printed and published only.	Printed for publication by others.						
United States.....	\$250,825,934	\$6,661,624	\$44,394,621	\$9,169,943	\$5,053,128	\$157,099,380	\$12,241,819	\$4,748,250	\$3,943,591	\$7,593,578
California.....	7,438,072	218,417	453,172	132,616	73,776	5,812,574	478,979	79,918	91,243	97,377
Illinois.....	39,474,143	465,027	7,783,151	581,038	518,685	25,306,538	2,243,465	614,592	927,565	1,034,082
Indiana.....	5,680,867	21,190	813,031	164,009	47,073	3,608,388	389,111	209,800	296,573	131,694
Massachusetts.....	17,138,951	329,126	5,158,126	1,334,841	125,753	8,604,920	1,215,935	18,883	220,873	130,494
Michigan.....	6,185,479	139,373	494,438	92,288	192,958	4,762,349	130,397	54,128	168,429	153,119
Minnesota.....	4,602,128	85,168	235,471	99,280	276,545	3,469,377	188,667	163,994	29,145	54,481
Missouri.....	12,240,660	99,577	658,011	185,798	478,692	9,214,409	259,710	632,541	188,958	524,964
New York.....	69,706,292	3,722,464	19,196,562	3,391,799	1,191,972	35,229,938	3,317,799	641,119	504,793	2,509,846
Ohio.....	14,987,412	327,614	2,812,093	553,460	462,390	9,533,896	406,769	307,918	279,512	303,762
Pennsylvania.....	21,810,516	311,449	4,122,762	1,018,603	250,514	14,107,336	929,128	408,740	157,941	504,045
Texas.....	4,110,397	15,614	285,562	48,769	146,364	2,587,550	199,865	264,114	270,034	292,525
All other states.....	47,551,017	946,605	2,382,242	1,567,442	1,288,406	34,882,107	2,481,996	1,352,505	812,625	1,857,189

¹ Includes sheet music and books of music printed and published or published by the establishment reporting to the value of \$28,115, and printed for publication by others to the value of \$150,180; engravings, lithographs, etc., printed for publication by others to the value of \$2,969,917; ready prints to the value of \$1,548,580; and stereotyped plates to the value of \$358,336, combined to avoid disclosures by states.

The printing and publishing, and the publishing only, of books and pamphlets contributed 17.7 per cent of the total value of all products of this branch of the industry. Over two-fifths of this value was reported from New York.

In 1909, as at previous censuses, there was a large duplication of values in book and pamphlet publications, since establishments doing publishing only were included as well as those engaged in job printing. Thus, the value of the same work frequently forms a part of the value of products of both the publishing establishment and of the concern doing the printing.

Table 29 shows the principal statistics for each of the four sub-branches of this part of the industry for 1909.

Table 29

ESTABLISHMENTS DOING CHEFELY OR WHOLLY—	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
Total.....	10,708	108,687	\$68,521,316	\$77,850,547	\$250,825,934	\$173,275,387
Job printing.....	9,721	99,122	60,596,553	68,074,849	198,006,676	129,931,727
Book publishing and printing....	163	7,727	4,353,839	6,019,409	17,338,734	11,319,325
Book publishing, without printing.	666	423	316,219	3,327,461	32,859,180	29,531,719
Linotype work, typesetting, etc....	158	1,415	1,254,705	228,828	2,721,444	2,492,616

Table 30 shows statistics relative to character and number of books and pamphlets published for 1909. Comparative statistics are not available for previous censuses.

	Titles or editions.	Volumes.	Copies.
Total number published.....	46,739	54,620	181,361,844
Biography and correspondence.....	554	616	657,464
Description, geography, and travel.....	847	952	4,540,647
Domestic and rural.....	330	336	2,023,193
Education.....	10,390	12,159	41,636,847
Fiction.....	14,606	15,772	46,942,399
Fine arts, including illustrated gift books.....	541	587	2,849,371
History.....	613	954	2,923,187
Humor and satire.....	208	211	885,282
Juvenile.....	4,167	4,202	10,184,030
Law.....	535	862	1,490,194
Literature and collected works.....	2,047	3,841	5,037,972
Medicine and hygiene.....	681	738	1,519,480
Philosophy.....	222	252	265,077
Physical and mathematical science.....	291	307	356,413
Poetry and the drama.....	1,387	1,574	1,980,624
Political and social science.....	658	689	1,862,429
Scientific and similar associations.....	1,082	1,141	1,258,562
Sports and amusements.....	412	423	2,430,074
Theology and religion.....	5,096	6,539	23,608,230
Useful arts.....	512	538	1,104,599
Works of reference.....	1,560	1,927	7,799,580

It will be noted that the number of copies of works on educational topics was nearly equal to the number reported as fiction. Works on theology and religion ranked third.

PRINTING AND PUBLISHING OF MUSIC.

The census of 1909 was the first at which products of establishments publishing music books and sheet music were segregated. Table 31 shows, by states, the statistics relative to the printing and publishing of music, for 1909.

The establishments doing publishing only were much more numerous than those which printed their own publications. Table 32 shows the general statistics for each class of establishments.

STATE.	Total.	SHEET MUSIC AND BOOKS OF MUSIC.		All other products. ¹
		Printed and published, or published by establishment.	Printed for publication by others.	
United States.....	\$5,575,803	\$4,581,342	\$848,038	\$146,523
Illinois.....	946,517	889,466	33,981	23,070
Massachusetts.....	352,312	352,312	.....	.....
New York.....	3,110,433	2,583,342	412,781	114,310
Ohio.....	384,537	309,605	74,832	.....
Pennsylvania.....	375,823	261,917	112,099	1,807
All other states.....	406,281	184,700	214,245	7,336

¹ Includes books and pamphlets to the value of \$58,748; job printing to the value of \$6,764; bookbinding and blank books to the value of \$37,219; and other products to the value of \$43,792.
² Excludes music "printed for publication by others" and "all other products," to avoid disclosure of individual operations.

ESTABLISHMENTS DOING—	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
Total.....	178	738	\$438,328	\$386,202	\$5,575,903	\$4,589,701
Printing.....	40	731	436,730	602,249	1,780,973	1,178,724
Publishing only.....	138	7	2,198	383,953	3,794,930	3,410,977

PRINTING AND PUBLISHING OF NEWSPAPERS AND PERIODICALS.

Products and receipts.—Table 33 shows the extent to which publishers of newspapers and periodicals engaged in other branches of the printing and publishing industry in 1909, 1904, and 1899.

KIND.	1909		1904	1899	Per cent of increase. ¹		
	Value.	Per cent of total.	Value.	Value.	1899-1909	1904-1909	1899-1904
	Total.....	\$406,090,122	100.0	\$309,301,854	\$222,983,569	82.1	31.3	38.7
Newspapers and periodicals.....	337,549,528	83.1	256,816,282	175,789,610	82.0	31.4	46.1
Advertising.....	202,527,925	49.9	145,517,591	95,861,127	111.3	39.2	51.8
Subscriptions and sales.....	135,021,603	33.2	111,298,691	79,928,483	68.9	21.3	39.2
Book and job printing.....	62,022,414	15.3	47,446,127	41,745,652	48.6	30.7	13.7
Books and pamphlets.....	19,516,591	4.8	14,697,941	18,407,528	6.0	32.8	-20.2
Sheet music and books of music.....	903,989	0.2	128,961	544,802	65.9	601.0	-76.3
Engravings, lithographs, etc.....	374,230	0.1	(²)	(²)	.....	.....	.....
Ready prints.....	744,497	0.2	(²)	(²)	.....	.....	.....
Stereotype plates.....	74,202	(²)	(²)	(²)	.....	.....	.....
Job printing, not elsewhere included ⁴	40,408,905	10.0	32,619,225	22,793,322	77.3	23.9	43.1
All other products or work.....	6,518,180	1.6	5,039,445	5,448,307	19.6	29.3	-7.5
Bookbinding.....	1,340,131	0.3	1,449,949	2,067,450	-35.2	-7.6	-29.9
Blank books.....	442,973	0.1	434,147	554,557	-20.1	2.0	-21.7
Electrotyping, engraving, etc.....	471,676	0.1	647,037	491,557	-4.0	-27.1	31.6
Miscellaneous.....	4,263,400	1.1	2,508,312	2,334,733	81.6	70.0	7.4

¹ A minus sign (-) denotes decrease.

² Not reported separately.

³ Less than one-tenth of 1 per cent.

⁴ Includes the printing of newspapers and periodicals for publication by others.

The receipts from the printing and publishing of newspapers and periodicals increased 92 per cent during the decade 1899-1909, and constituted at the end of that period 83.1 per cent of the total value of products reported by this branch of the printing and publishing industry. The larger part of these receipts, as well as the greater portion of the increase for the decade, was from advertising.

At the censuses prior to 1909 there was no segregation of the various receipts from printing for others from those for printing in general, and for this reason some of the sheet music and books of music so printed, as well as some books and pamphlets, may have been accounted for in 1904 and 1899 under "job printing not elsewhere included," or under "all other products and work." The item "job printing, not elsewhere included" is largely made up of receipts for printing newspapers, books, etc., for publication by others, though more of such work is done by establishments in the job-printing branch of the industry than by those in the newspaper and periodical branch. It is probable that the increase in "job printing, not elsewhere included," was even larger than indicated because the manufacture of engravings, lithographs, ready prints, and stereotype plates for sale, shown separately for 1909, was included with the job printing just mentioned, at the census of 1899.

Receipts from book and job printing for others constituted, in 1909, 15.3 per cent of the entire receipts of establishments in this branch of the industry. This item showed a marked absolute increase in 1909 over 1899, although it constituted a smaller proportion of the total receipts in the later census year.

Table 34 shows statistics for 1909 for newspaper publishing establishments that do no printing and for those that do both printing and publishing.

ESTABLISHMENTS DOING—	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
Total.....	18, 871	108, 672	\$74, 401, 593	\$97, 359, 605	\$406, 090, 122	\$308, 730, 517
Printing and publishing.....	15, 533	108, 137	74, 013, 775	89, 403, 701	340, 176, 310	250, 772, 609
Publishing only.....	3, 338	535	387, 818	7, 955, 904	65, 913, 812	57, 957, 908

The 3,338 newspaper and periodical publishing establishments which did no printing in 1909 constituted only 17.7 per cent of the total number of establishments in this branch of the industry and reported only 16.2 per cent of the total value of products reported.

Table 35 shows the ratio of cost of materials, wages, salaries, miscellaneous expense, and value added by manufacture to value of products in 1909 for each of the two classes of establishments—newspapers and periodicals.

Since the cost of contract work is reported under "miscellaneous expenses," it is natural that this item

should be unusually large in proportion to the other items in the reports of the publishers who did no printing, and that the returns of such establishments for wages and for cost of materials should be correspondingly small.

ESTABLISHMENTS DOING—	PERCENTAGE OF VALUE OF PRODUCTS REPRESENTED BY—				
	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value added by manufacture.
Printing and publishing.....	16.2	21.8	26.3	18.0	73.7
Publishing only.....	21.3	0.6	12.1	51.6	87.9

Distribution.—Table 36 shows, by states, the number of newspapers and periodicals of all classes for 1909 and 1904.

DIVISION AND STATE.	ALL CLASSES—NUMBER.	
	1909	1904
United States.....	22, 141	21, 848
NEW ENGLAND.....	1, 042	1, 175
Maine.....	130	158
New Hampshire.....	86	124
Vermont.....	82	100
Massachusetts.....	537	575
Rhode Island.....	47	60
Connecticut.....	160	158
MIDDLE ATLANTIC.....	3, 821	3, 785
New York.....	1, 953	1, 933
New Jersey.....	348	378
Pennsylvania.....	1, 520	1, 474
EAST NORTH CENTRAL.....	5, 086	5, 359
Ohio.....	1, 181	1, 250
Indiana.....	799	858
Illinois.....	1, 682	1, 753
Michigan.....	747	787
Wisconsin.....	677	711
WEST NORTH CENTRAL.....	4, 859	4, 810
Minnesota.....	758	798
Iowa.....	1, 004	1, 080
Missouri.....	1, 003	1, 032
North Dakota.....	333	235
South Dakota.....	402	302
Nebraska.....	623	636
Kansas.....	736	727
SOUTH ATLANTIC.....	1, 656	1, 621
Delaware.....	35	34
Maryland.....	163	199
District of Columbia.....	67	65
Virginia.....	258	241
West Virginia.....	214	222
North Carolina.....	264	240
South Carolina.....	138	148
Georgia.....	357	318
Florida.....	160	154
EAST SOUTH CENTRAL.....	1, 115	1, 091
Kentucky.....	339	337
Tennessee.....	330	334
Alabama.....	227	213
Mississippi.....	219	207
WEST SOUTH CENTRAL.....	2, 041	1, 758
Arkansas.....	288	291
Louisiana.....	198	197
Oklahoma.....	593	453
Texas.....	962	817
MOUNTAIN.....	1, 044	867
Montana.....	139	101
Idaho.....	130	95
Wyoming.....	70	51
Colorado.....	382	381
New Mexico.....	97	80
Arizona.....	73	60
Utah.....	94	88
Nevada.....	59	31
PACIFIC.....	1, 477	1, 382
Washington.....	369	316
Oregon.....	254	221
California.....	854	845

There was an increase of 1.3 per cent from 1904 to 1909 in the total number of newspapers and periodicals in the entire country. In the New England and East North Central divisions, however, there was a considerable decrease, due to a falling off in every state in these two divisions, with the exception of Connecticut.

Besides the states in these divisions, the following 10 states in other divisions reported a less number for 1909 than for 1904: New Jersey, Minnesota, Iowa, Missouri, Nebraska, Maryland, West Virginia, South Carolina, Tennessee, and Arkansas.

Classification according to character.—Table 37 shows the number of publications classified according to character in 1909 and 1904, and the percentages of increase from 1904 to 1909. Comparable figures for 1899 are not available.

The greatest absolute increase reported for any class was that in number of publications devoted to news, politics, and family reading, but the highest percent-

age of increase was in publications devoted to science and mechanics, with college and school periodicals second. Several classes of publications decreased in number, the largest absolute decrease being in those classed as "miscellaneous."

CHARACTER.	NUMBER.		Per cent of increase: ¹ 1904-1909
	1909	1904	
News, politics, and family reading.....	17,698	17,032	3.9
Religious.....	1,251	1,287	-2.8
Agricultural, horticultural, dairy, stock raising, etc.	316	360	-12.2
Commerce, finance, insurance, railroads, etc.....	264	364	-27.5
Trade journals generally.....	685	627	9.2
General literature, including monthly and quarterly magazines.....	340	328	3.7
Medicine and surgery.....	197	192	2.6
Law.....	56	81	-30.9
Science and mechanics.....	139	83	67.5
Fraternal organizations.....	419	450	-6.9
Education and history.....	202	173	16.8
Society, art, music, fashions, etc.....	164	155	5.8
College and school periodicals.....	271	178	52.2
Miscellaneous.....	139	538	-74.2

¹ A minus sign (-) denotes decrease.

Table 38 shows, by states, the number of publications classified according to character for 1909.

CHARACTER OF PUBLICATION AND STATE.	Number.	CHARACTER OF PUBLICATION AND STATE.	Number.	CHARACTER OF PUBLICATION AND STATE.	Number.	CHARACTER OF PUBLICATION AND STATE.	Number.
NEWS, POLITICS, AND FAMILY READING:		AGRICULTURAL, HORTICULTURAL, DAIRY, STOCK RAISING, ETC.—Continued.		GENERAL LITERATURE—Con.		FRATERNAL—Continued.	
United States.....	17,698	New York.....	28	Ohio.....	14	New York.....	37
California.....	674	Ohio.....	7	Pennsylvania.....	17	Ohio.....	30
Georgia.....	286	Pennsylvania.....	12	All other states.....	108	All other states.....	244
Illinois.....	1,169	All other states.....	212	MEDICINE AND SURGERY:		EDUCATION AND HISTORY:	
Indiana.....	718	United States.....	264	United States.....	197	United States.....	202
Iowa.....	891	Illinois.....	23	Illinois.....	20	Illinois.....	33
Kansas.....	679	Michigan.....	5	Michigan.....	11	Massachusetts.....	18
Massachusetts.....	326	New York.....	91	Missouri.....	19	New York.....	37
Michigan.....	634	Pennsylvania.....	24	New York.....	42	Pennsylvania.....	15
Minnesota.....	643	All other states.....	121	Pennsylvania.....	18	All other states.....	99
Missouri.....	797	TRADE JOURNALS:		All other states.....	87	SOCIETY, ART, MUSIC, AND FASHION:	
Nebraska.....	558	United States.....	885	United States.....	56	United States.....	164
New York.....	1,080	Illinois.....	102	Illinois.....	10	Illinois.....	10
Ohio.....	882	Massachusetts.....	25	Massachusetts.....	3	Massachusetts.....	9
Pennsylvania.....	1,013	Michigan.....	15	Michigan.....	4	New York.....	75
Texas.....	857	Missouri.....	37	New York.....	8	Pennsylvania.....	12
Wisconsin.....	596	New York.....	191	All other states.....	27	All other states.....	58
All other states.....	5,895	Ohio.....	42	SCIENCE AND MECHANICS:		COLLEGE AND SCHOOL PERIODICALS:	
RELIGIOUS:		Pennsylvania.....	62	United States.....	139	United States.....	271
United States.....	1,251	All other states.....	211	District of Columbia.....	4	Illinois.....	28
Illinois.....	123	GENERAL LITERATURE:		Illinois.....	26	Massachusetts.....	17
Massachusetts.....	55	United States.....	340	New York.....	52	New York.....	26
New York.....	135	Illinois.....	36	Pennsylvania.....	20	Pennsylvania.....	29
Ohio.....	142	Iowa.....	6	All other states.....	37	Texas.....	13
Pennsylvania.....	252	Kansas.....	5	FRATERNAL:		All other states.....	158
Tennessee.....	53	Maine.....	10	United States.....	419	MISCELLANEOUS:	
All other states.....	491	Massachusetts.....	18	Illinois.....	49	United States.....	139
AGRICULTURAL, HORTICULTURAL, DAIRY, STOCK RAISING, ETC.:		Missouri.....	14	Indiana.....	17	Illinois.....	17
United States.....	316	New York.....	112	Iowa.....	10	Massachusetts.....	9
Illinois.....	36			Massachusetts.....	22	New York.....	39
Iowa.....	21			Nebraska.....	10	All other states.....	74

New York leads in number of publications in the interest of commerce, finance, insurance, railroads, and of trade journals; and in such as are devoted to general literature, education and history, medicine and surgery, science and mechanics, and to society, art, music, and fashion. Illinois is first in number of publications classed under "news, politics, and family reading"; "agricultural, horticultural, dairy, stock raising, etc.," "law," and "fraternal." Pennsylvania leads in religious publications, and in college and school periodicals.

Classification according to language.—Table 39 shows the number of publications in English and in several of the foreign languages for 1909 and 1904, and the percentages of increase from 1904 to 1909.

LANGUAGE.	NUMBER.		Per cent of increase: ¹ 1904-1909
	1909	1904	
Total.....	22,141	21,848	1.4
English.....	20,744	20,599	0.7
Foreign (including foreign and English).....	1,397	1,249	11.8
French.....	39	46	-15.2
German.....	692	700	-1.1
Italian.....	104	63	65.1
Scandinavian.....	161	162	-0.6
Letto-Slavic.....	169	128	32.0
All other.....	232	150	54.7

¹ A minus sign (-) denotes decrease.

The number of publications in English did not increase, either absolutely or proportionately, as much as the number in foreign languages, the absolute increase being 145 in the case of the former, as com-

pared with 148 in the case of the latter, and the percentage of gain, seven-tenths of 1 per cent, as compared with 11.8 per cent. The percentage of increase was greatest (65.8 per cent) for publications in Italian, and that for those in Letto-Slavic came next with 32 per cent.

Publications in French and German decreased in number. These statements, however, are not to be taken as necessarily conveying any idea of increase or decrease in circulation, for fewer publications at one census may show a greater circulation than a larger number of publications at another census.

Circulation of newspapers and periodicals in general.—In all tables where average circulation is shown, the figures are for the average circulation per issue as reported to the Bureau of the Census.

At censuses prior to 1909 the Sunday newspapers and periodicals were not shown separately in the reports, but were treated as editions of dailies if published by daily newspapers, or as weeklies if published by concerns publishing no other newspaper. At the census of 1909 these Sunday newspapers and periodicals were tabulated separately.

In tables showing number and circulation of all classes of publications, 1909 and 1904 only, the 1904 figures for circulation of daily—number is not affected—and for both number and circulation of Sunday and weekly publications, are made comparable according to the method employed at the census of 1909. This is true, also, of the 1904 figures for dailies, Sundays, and weeklies, when totals for these are shown in separate tables. It was not possible to change the figures for 1899.

In 1904 and 1899 the average daily circulation was computed in the following manner: The daily non-Sunday circulation as reported was multiplied by six, representing the six days' issues; the Sunday circulation was added, and the total thus obtained divided by seven. This daily average was in many cases greater than the average for the six days, without Sunday, as the Sunday paper generally had the larger circulation.

Table 40 shows the aggregate number of copies per annum of all newspapers and periodicals classified according to period of issue for 1909 and 1904. The figures are derived from the average circulation per issue.

CLASS.	AGGREGATE NUMBER OF COPIES PUBLISHED DURING YEAR.	
	1909	1904
Total	11,591,353,613	9,887,416,245
Daily.....	7,578,348,801	6,145,004,739
Sunday.....	694,058,664	625,161,732
Triweekly.....	52,320,684	46,206,264
Semiweekly.....	240,543,576	305,496,256
Weekly.....	2,122,794,180	1,883,789,284
Monthly.....	759,366,420	771,673,860
Quarterly.....	64,232,396	46,838,620
All other classes.....	79,688,892	63,245,490

Table 41 shows the number of all the newspapers and periodicals grouped according to period of issue, and gives the aggregate number of copies per issue of the publications of each class for the years 1909, 1904, and 1899, the figures for 1909 being adjusted to correspond, in the matter of Sunday newspapers and periodicals, with those of 1904 and 1899.

	1909	1904	1899
Number	21,653	21,394	18,226
Daily (including Sunday editions of dailies)—			
Number.....	2,600	2,452	2,226
Aggregate circulation.....	24,359,195	19,898,134	15,102,156
Triweekly—			
Number.....	73	58	62
Aggregate circulation.....	335,389	296,194	228,610
Semiweekly—			
Number.....	635	645	637
Aggregate circulation.....	2,312,919	2,937,404	2,832,868
Weekly (including exclusively Sunday issues)—			
Number.....	15,129	15,046	12,979
Aggregate circulation.....	41,283,714	36,732,037	34,242,052
Monthly—			
Number.....	2,491	2,500	1,817
Aggregate circulation.....	63,290,535	64,306,155	37,869,897
Quarterly—			
Number.....	361	353	237
Aggregate circulation.....	16,053,099	11,709,655	11,067,422
All other—			
Number.....	364	340	268
Aggregate circulation.....	4,093,874	2,878,594	5,546,329

Table 42 shows the absolute and relative increase in circulation per issue for each class for the 10 years 1899 to 1909 and for each five-year period.

CLASS.	INCREASE IN CIRCULATION PER ISSUE. ¹					
	1899-1909		1904-1909		1899-1904	
	Absolute.	Per cent.	Absolute.	Per cent.	Absolute.	Per cent.
Daily.....	9,257,039	61.3	4,461,061	22.4	4,795,978	31.8
Triweekly.....	105,779	46.7	39,195	13.2	67,584	29.6
Semiweekly.....	-519,949	-18.4	-624,545	-21.2	104,596	3.7
Weekly.....	7,041,662	20.6	4,551,677	12.4	2,489,985	7.3
Monthly.....	25,410,638	67.1	-1,025,620	-1.6	26,436,258	69.8
Quarterly.....	4,990,677	45.1	4,348,444	37.1	642,233	5.8
All other classes.....	-1,452,455	-26.2	1,215,280	42.2	-2,667,735	-48.1

¹ A minus sign (-) denotes decrease.

The circulation of the daily and of the monthly publications increased during the decade in about the same proportions, 61.3 per cent and 67.1 per cent, respectively. That of the triweekly, weekly, and quarterly publications increased considerably, while that of semiweeklies and "all other classes" decreased.

A great increase in the circulation of the quarterlies, as shown by Table 42, took place between 1904 and 1909, and in that of monthly publications, between 1899 and 1904. The decrease in the circulation of the latter class between 1904 and 1909 was due largely to the discontinuance in the state of Maine of several publications of low subscription rates which had reported a very large combined circulation.

Among "all other classes" were included the publications issued semimonthly and bimonthly, semi-

quarterly, and at various infrequent intervals from three to ten times a year, semiannually and annually. From 1899 to 1904, however, there was a great decrease in the circulation of such publications.

Circulation per 1,000 literate population.—Table 43 shows the circulation of the newspapers and periodicals classified according to period of issue, the average circulation per issue and the average circulation per 1,000 literate persons 10 years of age and over being given for 1909 and 1899 for each class.

CLASS.	NEWSPAPERS AND PERIODICALS IN ALL LANGUAGES.			
	Average circulation per issue.		Circulation per 1,000 literate population 10 years of age and over. ¹	
	1909	1899	1909	1899
Daily (including Sunday edition of daily).....	24,359,195	15,102,156	369	292
Triweekly.....	335,389	223,610	5	4
Semiweekly.....	2,312,919	2,532,868	35	55
Weekly (including exclusively Sunday).....	41,283,714	34,242,052	625	661
Monthly.....	63,280,535	37,869,897	958	732
Quarterly.....	16,058,099	11,067,422	243	214
All other.....	4,093,874	5,546,329	62	107

¹ Based on literate population 10 years of age and over—1910, 66,064,107; 1900, 51,769,755.

The decrease in average circulation of weekly publications per 1,000 literate population was confined to newspapers, the circulation of weeklies other than newspapers showing an increase during the decade. (See discussion under "weeklies," p. —.) The daily newspapers and the monthly publications showed large increases in circulation per 1,000 literate population, the increases being 26.4 per cent for the daily and 30.9 per cent for the monthly publications.

Period of issue.—Table 44 shows the number and aggregate circulation of daily, Sunday, and weekly newspapers in 1909 and 1904, and the absolute and relative increases in each class during the five-year period 1904–1909.

	1909	1904	INCREASE.	
			Absolute.	Per cent.
Daily (exclusive of Sunday):				
Number.....	2,600	2,452	148	6.0
Aggregate circulation.....	24,211,977	19,632,603	4,579,374	23.3
Sunday:				
Number.....	520	494	26	5.3
Aggregate circulation.....	13,347,282	12,022,341	1,324,941	11.0
Weekly:				
Number.....	15,097	15,006	91	0.6
Aggregate circulation.....	40,822,965	36,226,717	4,596,248	12.7

Dailies.—The daily newspaper, according to the present census definition, is a publication issued every week day, Sunday editions of such publications being excluded. A morning and evening paper issued by the same plant are counted as two papers. There are a few daily publications that do not contain the general

news. In 1909, 23 such publications were reported, including 15 college dailies, 3 financial guides or financial news reports, 1 agricultural paper, a furniture trade journal, a law publication, a religious journal (Bohemian), and a summer hotel paper. Statistics for these are included in the tables, but their aggregate circulation is insignificant.

Table 45 shows, by geographic divisions and states, the number of daily newspapers, divided into morning and evening publications, for 1909, 1904, and 1899.

DIVISION AND STATE.	NUMBER OF DAILY PUBLICATIONS.								
	Total.			Morning.			Evening.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
United States.....	2,600	2,452	2,226	760	637	695	1,840	1,815	1,631
NEW ENGLAND.....	172	179	192	45	44	50	127	135	142
Maine.....	14	17	15	7	6	5	7	11	10
Massachusetts.....	86	89	98	15	21	25	71	68	73
Rhode Island.....	12	13	12	4	3	3	8	10	9
Connecticut.....	38	36	44	11	9	13	27	27	31
New Hampshire and Vermont.....	22	24	23	8	5	4	14	19	19
MIDDLE ATLANTIC.....	508	492	452	166	134	122	342	358	330
New York.....	231	217	207	84	65	63	147	152	144
New Jersey.....	54	55	49	19	13	7	35	42	42
Pennsylvania.....	223	220	196	63	56	52	160	164	144
EAST NORTH CENTRAL.....	702	694	653	156	128	123	546	566	530
Ohio.....	184	190	170	37	38	24	147	152	146
Indiana.....	172	161	156	38	28	26	134	133	130
Illinois.....	194	192	197	51	36	44	143	156	153
Michigan.....	87	86	70	20	16	14	67	70	56
Wisconsin.....	65	65	60	10	10	15	55	55	45
WEST NORTH CENTRAL.....	344	330	311	77	77	74	267	253	237
Minnesota.....	42	51	44	10	16	12	32	35	32
Iowa.....	68	66	65	15	15	16	53	51	49
Missouri.....	91	92	92	20	24	24	71	68	68
Nebraska.....	34	31	32	11	10	7	23	21	25
Kansas.....	78	65	53	12	6	7	66	59	46
North Dakota and South Dakota.....	31	25	25	9	6	8	22	19	17
SOUTH ATLANTIC.....	186	183	159	75	71	64	111	112	95
Maryland.....	18	20	18	9	10	8	9	10	10
Virginia.....	32	31	37	13	14	15	19	17	22
West Virginia.....	34	33	19	11	11	6	23	22	13
North Carolina.....	31	30	26	9	10	8	22	20	18
South Carolina.....	13	14	7	5	4	3	8	10	4
Georgia.....	27	26	27	14	11	15	13	15	12
Florida.....	19	20	11	7	8	4	12	12	7
Delaware and District of Columbia.....	12	9	14	7	3	5	5	6	9
EAST SOUTH CENTRAL.....	95	86	75	39	33	30	56	53	45
Kentucky.....	35	34	27	16	14	10	19	20	17
Tennessee.....	16	17	16	7	8	9	9	9	7
Alabama.....	26	21	19	11	8	8	15	13	11
Mississippi.....	18	14	13	5	3	3	13	11	10
WEST SOUTH CENTRAL.....	218	183	141	53	34	37	165	149	104
Arkansas.....	29	27	20	6	3	4	23	24	16
Louisiana.....	23	25	23	6	7	8	17	18	15
Oklahoma.....	67	44	15	15	6	3	52	38	12
Texas.....	99	87	83	26	18	22	73	69	61
MOUNTAIN.....	137	105	90	54	35	31	83	70	59
Montana.....	17	12	11	6	5	5	11	7	6
Colorado.....	53	42	42	19	13	13	34	29	29
Arizona.....	19	16	10	8	5	4	11	11	6
Nevada.....	16	9	9	7	3	3	8	6	6
Idaho, Wyoming, New Mexico, and Utah.....	33	26	18	14	9	6	19	17	12
PACIFIC.....	238	200	153	95	81	64	143	119	89
Washington.....	41	29	15	17	10	8	24	19	7
Oregon.....	31	23	21	13	9	9	18	14	12
California.....	166	148	117	65	62	47	101	86	70

The increase during the decade in the total number of daily newspapers in the United States was 374, or 16.8 per cent—every geographic division but New England sharing in the gain. The greatest increases, both absolute and relative, were reported by the Pacific and West South Central divisions. Every state

in New England except Rhode Island, whose number remained stationary, showed a loss in the number of dailies between 1899 and 1909.

Table 46 shows the average circulation of daily newspapers, not including Sunday editions, in 1909

and 1904, for the total of such publications and also for morning and evening issues. In order to avoid disclosures of the reported circulation of certain newspapers, the statistics for a few of the states have been combined.

Table 46

DIVISION AND STATE.	DAILY NEWSPAPERS AND PERIODICALS.											
	Average combined circulation per issue, exclusive of Sunday editions.							Per cent of total.				
	Total.				Morning.		Evening.		Morning.		Evening.	
	1909	Per cent of total: 1909	1904	Per cent of increase: 1904-1909	1909	1904	1909	1904	1909	1904	1909	1904
United States.....	24,211,977	100.0	19,632,603	23.3	9,606,694	7,843,666	14,606,283	11,789,038	39.7	40.0	60.3	60.0
New England.....	2,350,643	9.7	1,976,643	19.0	840,831	891,062	1,508,612	1,084,591	35.8	45.1	64.2	54.0
Maine.....	85,363	0.4	74,287	14.9	44,713	30,175	40,650	44,112	52.4	40.6	47.6	59.4
Massachusetts.....	1,765,690	7.3	1,453,263	21.5	652,632	760,933	1,113,058	692,330	37.0	52.4	63.0	47.6
Rhode Island.....	147,045	0.6	131,056	12.2	30,838	20,186	116,207	110,870	21.0	15.4	79.0	84.6
Connecticut.....	258,543	1.1	229,357	12.7	71,942	61,629	186,601	177,728	27.8	22.5	72.2	77.5
New Hampshire and Vermont.....	94,002	0.4	87,680	7.2	40,706	28,129	53,296	59,551	43.3	32.1	56.7	67.9
Middle Atlantic.....	6,614,971	35.6	7,393,167	16.4	3,606,476	2,811,460	5,109,495	4,486,707	40.7	38.4	59.3	60.8
New York.....	5,253,521	21.7	4,873,640	14.9	2,168,690	1,715,599	3,084,831	2,858,051	41.3	37.5	58.7	62.5
New Jersey.....	437,144	1.8	303,930	43.8	110,959	42,708	326,185	261,224	25.4	14.1	74.6	85.9
Pennsylvania.....	2,924,306	12.1	2,520,887	15.0	1,225,827	1,153,155	1,698,479	1,367,432	41.9	45.7	58.1	54.3
East North Central.....	5,576,164	23.0	4,700,985	18.6	1,776,696	1,481,699	3,797,266	3,219,086	31.9	31.6	66.1	66.5
Ohio.....	1,542,855	6.4	1,357,135	13.7	385,254	342,426	1,157,601	1,014,709	25.0	25.2	75.0	74.8
Indiana.....	625,591	2.6	538,121	16.3	219,665	216,547	405,926	321,574	35.1	40.2	64.9	59.8
Illinois.....	2,323,913	9.6	1,954,329	18.9	889,180	693,700	1,434,733	1,260,629	38.3	35.5	61.7	64.5
Michigan.....	681,919	2.8	544,282	25.3	179,757	141,872	502,162	402,410	26.4	26.1	73.6	73.9
Wisconsin.....	401,886	1.7	307,118	30.9	105,042	87,354	296,844	219,764	26.1	28.4	73.9	71.6
West North Central.....	3,167,058	13.1	2,299,363	37.7	1,339,874	942,117	1,827,184	1,357,236	42.3	41.0	57.7	59.0
Minnesota.....	476,252	2.0	460,811	3.4	116,212	169,918	360,040	290,893	24.4	36.9	75.6	63.1
Iowa.....	450,919	1.8	327,211	37.8	110,794	89,799	340,125	237,412	24.6	27.4	75.4	72.6
Missouri.....	1,624,621	6.7	1,126,760	44.2	892,263	550,210	732,358	576,550	54.9	48.8	45.1	51.2
Nebraska.....	262,109	1.1	185,835	41.0	85,929	56,990	176,180	128,845	32.8	30.7	67.2	69.3
Michigan.....	250,050	1.0	155,368	60.9	96,130	55,900	153,920	99,468	38.4	36.0	61.6	64.0
North and South Dakota.....	103,107	0.4	43,368	137.7	38,546	19,300	64,561	24,068	37.4	44.5	62.6	55.5
South Atlantic.....	1,197,455	4.9	979,712	22.2	574,566	492,131	622,669	497,561	48.0	49.2	52.0	50.6
Maryland.....	310,870	1.3	296,878	4.7	170,516	175,545	140,354	121,333	54.9	59.1	45.1	40.9
Virginia.....	174,149	0.7	131,099	32.8	78,253	64,249	95,896	66,850	44.9	49.0	55.1	51.0
West Virginia.....	99,407	0.4	75,345	31.9	45,086	36,605	54,321	40,740	45.4	45.9	54.6	54.1
North Carolina.....	93,952	0.4	65,232	44.0	49,623	36,391	44,329	28,841	52.8	45.9	47.2	44.2
South Carolina.....	51,624	0.2	32,193	60.4	33,115	18,243	18,509	18,950	64.1	56.7	35.9	43.3
Georgia.....	215,660	0.9	178,904	20.5	84,541	76,884	131,119	102,020	39.2	43.0	60.8	57.0
Florida.....	80,300	0.3	54,876	46.3	44,802	30,490	35,498	24,385	55.8	55.6	44.2	44.4
Delaware and District of Columbia.....	171,493	0.7	145,186	18.1	68,650	45,724	102,843	99,462	40.0	31.5	60.0	68.5
East South Central.....	658,675	2.7	487,811	40.8	307,641	210,241	351,034	267,570	46.7	44.9	53.3	56.1
Kentucky.....	226,180	0.9	162,658	39.1	89,164	64,391	137,016	98,277	39.4	39.6	60.6	60.4
Tennessee.....	245,658	1.0	183,050	34.2	127,295	108,968	118,363	74,062	51.8	59.5	48.2	40.5
Alabama.....	139,345	0.6	99,853	39.6	72,982	31,142	66,363	68,711	52.4	31.2	47.6	63.8
Mississippi.....	47,492	0.2	22,250	113.4	18,200	5,750	29,292	16,500	38.3	25.8	61.7	74.2
West South Central.....	712,442	2.9	494,591	44.0	341,142	223,992	371,300	270,698	47.9	46.3	52.1	54.7
Arkansas.....	60,175	0.2	39,942	50.7	29,974	12,050	30,201	27,892	49.8	30.2	50.2	63.8
Louisiana.....	136,228	0.6	134,828	1.0	64,946	63,330	71,290	71,498	47.7	47.0	52.3	53.0
Oklahoma.....	185,479	0.8	74,461	149.1	79,817	31,347	105,662	43,104	43.0	42.1	57.0	57.9
Texas.....	330,562	1.4	245,370	34.7	166,405	117,265	164,157	128,105	50.3	47.8	49.7	62.2
Mountain.....	664,099	2.3	368,006	63.3	293,524	155,619	270,575	212,487	52.0	42.3	48.0	57.7
Montana.....	70,203	0.3	58,669	19.7	36,146	28,269	34,057	30,400	51.5	48.2	48.5	51.8
Colorado.....	335,147	1.4	209,185	60.2	159,250	82,362	175,897	126,823	47.5	39.4	52.5	60.6
Arizona.....	33,328	0.1	22,354	49.1	17,840	9,814	15,488	12,540	63.5	43.9	46.6	56.1
Nevada.....	15,830	0.1	6,930	128.4	2,980	9,662	6,268	3,950	60.4	43.0	39.6	57.0
Idaho, Wyoming, New Mexico, and Utah.....	109,591	0.5	70,868	54.6	70,726	32,094	38,865	38,774	64.5	45.3	35.5	54.7
Pacific.....	1,370,470	5.7	948,345	44.6	623,722	546,184	746,748	403,181	45.6	67.5	54.5	42.5
Washington.....	317,158	1.3	186,618	70.0	111,058	83,449	206,100	103,169	35.0	44.7	65.0	55.3
Oregon.....	150,560	0.6	92,171	63.3	55,375	38,150	54,021	36,818	36.8	41.4	63.2	58.6
California.....	902,752	3.7	669,556	34.8	457,289	422,565	445,463	245,891	50.7	63.3	49.3	36.7

Over one-third of the total circulation for the United States in 1909 was reported by the states of the Middle Atlantic division, and considerable over one-fifth by those of the East North Central division.

Among the individual states New York led with over one-fifth of the total circulation of the country, Pennsylvania following with a little more than one-eighth, and Illinois with about one-tenth. Massachusetts, Missouri, Ohio, and California were the only remaining states having over 3 per cent of the total circulation.

The greatest absolute increase in the total circulation of dailies reported by any division was 1,216,814, reported by the Middle Atlantic division, and the least, 190,864, by the East South Central. The greatest percentage of increase (53.3 per cent) is shown for the Mountain division, and the least (16.4 per cent) for the Middle Atlantic.

Among the states New York reported the greatest absolute increase in circulation (679,881), and Louisiana the least (1,398). Oklahoma, with a total of 185,479 in 1909, reported the highest percentage of gain (149.1 per cent), and Louisiana the lowest (1 per cent).

In 1909 the circulation of the evening exceeded that of the morning publications in eight of the nine geographic divisions. In only two of these—the New England and the South Atlantic—was the relative increase greater than in 1904. The Mountain division is the only one of the divisions in which the morning circulation was greater than the evening, a reversal of conditions as reported for that division for 1904. On the other hand, the Pacific division, in which the morning circulation was the larger in 1904, reported the evening circulation as the larger in 1909.

Maine among the New England states and Missouri among the West North Central states reported in 1909 a larger morning than evening circulation, as

did also 11 other states in other divisions. In most of these states, however, the evening circulation exceeded the morning in 1904.

Dailies in 10 leading cities.—Table 47 shows the number and circulation of dailies, both morning and evening, published in 10 leading cities (those having a population in 1910 of 400,000 or over) for 1909 and 1904.

Table 47 DAILY NEWSPAPERS AND PERIODICALS IN CITIES HAVING A POPULATION OF 400,000 AND OVER.

CITY.	Number.						Average combined daily circulation.		
	Total.		Morning.		Evening.		1909	1904	Per cent increase, 1904-1909
	1909	1904	1909	1904	1909	1904			
	1909	1904	1909	1904	1909	1904	1909	1904	Per cent increase, 1904-1909
Total, 10 cities...	251	234	126	113	125	121	11,371,945	9,915,344	14.7
New York, N. Y.....	85	75	44	37	41	38	4,090,922	3,588,193	14.0
Chicago, Ill.....	39	34	19	11	20	23	1,809,325	1,584,187	14.2
Philadelphia, Pa.....	22	21	12	12	10	9	1,533,597	1,405,866	9.1
St. Louis, Mo.....	14	15	7	10	7	5	666,235	565,716	17.8
Boston, Mass.....	13	14	5	6	8	8	1,300,069	1,054,365	23.3
Cleveland, Ohio.....	13	13	5	4	8	9	403,151	349,058	15.5
Baltimore, Md.....	10	11	7	7	3	4	285,000	276,429	3.1
Pittsburgh, Pa.....	13	11	6	6	7	5	537,933	466,024	15.4
Buffalo, N. Y.....	13	11	2	2	11	9	311,131	285,114	9.1
San Francisco, Cal.....	29	29	19	18	10	11	434,582	340,392	27.7

The circulation of daily newspapers and periodicals printed in these 10 cities constituted 47 per cent of the total daily circulation of the entire country in 1909, as against 50.5 per cent in 1904. This change shows that the circulation of dailies published outside of the great centers of population has been increasing during the past few years more rapidly than that of papers in those centers. The circulation of the daily newspapers published in New York City constituted 16.9 per cent of the total for all dailies in the country in 1909, as compared with 18.3 per cent in 1904.

Table 48 shows the circulation of morning and evening dailies in nine of the cities for 1909 and 1904. The statistics for Buffalo must be omitted to avoid disclosing the circulation of individual papers.

Table 48 MORNING AND EVENING NEWSPAPERS AND PERIODICALS IN CITIES HAVING A POPULATION OF 400,000 AND OVER.

CITY.	Average combined circulation per issue.						Per cent of total.			
	Morning.			Evening.			Morning.		Evening.	
	1909	1904	Percent of increase: ¹ 1904-1909	1909	1904	Percent of increase: ¹ 1904-1909	1909	1904	1909	1904
	1909	1904	Percent of increase: ¹ 1904-1909	1909	1904	Percent of increase: ¹ 1904-1909	1909	1904	1909	1904
Total for 9 cities²	4,978,143	4,298,534	15.8	6,084,671	5,331,696	14.1	45.0	44.6	55.0	55.4
New York, N. Y.....	1,806,820	1,394,196	29.6	2,284,102	2,193,997	4.1	44.2	38.9	55.8	61.1
Chicago, Ill.....	755,683	604,584	25.0	1,053,642	979,603	7.6	41.8	38.2	58.2	61.8
Philadelphia, Pa.....	753,309	732,820	2.8	780,288	673,037	15.9	49.1	52.1	50.9	47.9
St. Louis, Mo.....	284,816	318,403	-10.5	381,419	247,313	54.2	42.8	56.3	57.2	43.7
Boston, Mass.....	560,663	461,221	21.6	739,406	593,144	24.7	43.1	43.7	56.9	56.3
Cleveland, Ohio.....	158,920	93,917	69.2	244,231	255,141	-4.3	39.4	26.9	60.6	73.1
Baltimore, Md.....	164,447	170,145	-3.3	120,553	106,284	13.4	57.7	61.6	42.3	38.4
Pittsburgh, Pa.....	211,131	261,949	-19.4	326,802	204,075	60.1	39.2	56.2	60.8	43.8
San Francisco, Cal.....	280,354	261,290	7.3	154,228	79,102	95.0	64.5	76.8	35.5	23.2

¹ A minus sign (-) denotes decrease.
² Buffalo not included, as only two morning papers were published in that city, and to present the circulation for these would disclose the business of individual establishments.

The preponderance of the evening circulation was not only maintained from 1904 to 1909, but increased in New York, Chicago, Philadelphia, Boston, and Cleveland; and that of the morning, but with decreasing proportions, in Baltimore and San Francisco. At the census of 1909 St. Louis had, as reported, a larger circulation of evening dailies than of morning; this condition was reversed in 1904. The morning circulation of Pittsburgh dailies was reported as superior in size to the evening for 1904; at the census of 1909 the figures showed that the evening circulation was the larger.

Language.—Table 49 shows the number and circulation of daily newspapers and periodicals in English and in languages other than English for 1909 and 1904.

	NUMBER.		AVERAGE COMBINED CIRCULATION PER ISSUE.				
	1909	1904	1909	Per cent of total.	1904	Per cent of total.	Per cent of increase: 1904-1909
Total.....	2,690	2,452	24,211,877	100.0	19,632,603	100.0	23.3
English.....	2,463	2,325	22,425,696	92.6	18,416,711	93.8	21.8
Foreign.....	137	127	1,786,281	7.4	1,215,892	6.2	46.9

The percentage of increase in the circulation of newspapers in foreign languages was more than double that of publications in English.

Table 50 shows the number and circulation, by states, of the dailies published in languages other than English in 1909 and 1904.

STATE.	DAILY PUBLICATIONS IN FOREIGN LANGUAGES.				
	Number.		Average combined circulation per issue.		Per cent of increase: ¹ 1904-1909
	1909	1904	1909	1904	
United States.....	137	127	1,786,281	1,215,892	46.9
California.....	13	11	48,633	34,350	41.6
Illinois.....	21	20	271,500	200,180	35.6
Indiana.....	5	7	17,766	14,350	23.8
Massachusetts.....	5	3	16,200	11,232	44.2
Michigan.....	5	4	18,975	11,300	67.9
Missouri.....	6	5	141,151	75,060	85.8
New Jersey.....	3	4	8,850	8,910	-0.7
New York.....	35	28	968,340	557,956	73.6
Ohio.....	11	11	89,665	69,687	28.7
Pennsylvania.....	8	10	75,649	112,127	-32.5
Wisconsin.....	6	8	58,433	54,774	6.7
All other states ¹	19	16	71,119	65,066	9.3

¹ A minus sign (-) denotes decrease.

² Includes: In 1909, Colorado, 1 publication; Connecticut, 1; Florida, 1; Iowa, 2; Kentucky, 1; Louisiana, 1; Maryland, 2; Minnesota, 2; Oregon, 1; Rhode Island, 1; Texas, 2; Virginia, 1; Washington, 2; West Virginia, 1. In 1904, Colorado, 1 publication; Iowa, 1; Kentucky, 1; Louisiana, 2; Maryland, 2; Minnesota, 2; New Hampshire, 1; Rhode Island, 1; Texas, 1; Virginia, 2; Washington, 1; West Virginia, 1.

More than half of the circulation of dailies printed in foreign languages in 1909 was of publications issued in New York, which state also showed the greatest gain in circulation of any state between 1904 and 1909. A slight loss in the circulation of such papers

is shown as having taken place in New Jersey, and a much larger one in Pennsylvania.

Table 51 shows the number of dailies printed in each of the foreign languages represented, for 1909 and 1904.

LANGUAGE.	NUMBER OF DAILIES IN FOREIGN LANGUAGES.	
	1909	1904
Total foreign.....	137	127
Arabic.....	1	1
Bohemian.....	7	6
Chinese.....	3	4
Croatian.....	1	.....
Danish and Norwegian.....	1	.....
Finnish.....	1	1
French.....	9	8
German.....	65	75
Greek.....	1	.....
Hungarian.....	3	3
Italian.....	10	7
Japanese.....	8	4
Japanese and English.....	1	.....
Norwegian.....	.....	1
Norwegian and Danish.....	1	1
Polish.....	9	6
Slavonic (not specified).....	.....	1
Slovak.....	1	.....
Slovenic.....	1	1
Spanish.....	3	.....
Yiddish.....	11	8

¹ Includes 1 Hebrew.

The German dailies led in number in 1909, but with a decrease of 10 as compared with 1904. New York was first and Illinois next in the number of such dailies, a reversal of the conditions in this respect existing at the earlier census. Yiddish dailies were second in number and Italian dailies third. New York reported more dailies in these languages than any other state, and also the only Arabic daily, the only Croatian daily, and the only Greek daily reported. But one Finnish and one Slovak daily were reported, the former from Michigan and the latter from Pennsylvania. The three Chinese dailies were all published in California, while of the three Spanish dailies Texas reported two and Florida one.

Table 52 shows the average daily number of copies of the publications in each language so far as this can be shown without disclosure of the circulation of individual papers for 1909 and 1904.

LANGUAGE.	AVERAGE COMBINED CIRCULATION PER ISSUE.		
	1909	1904	Per cent of increase: ¹ 1904-1909
Total.....	1,786,281	1,215,892	46.9
Bohemian.....	52,143	45,267	15.2
Chinese.....	9,500	8,800	8.0
French.....	40,230	47,872	-16.0
German.....	753,116	680,231	10.7
Hungarian.....	54,300	21,700	150.2
Italian.....	160,300	91,350	75.6
Japanese.....	24,603	9,500	159.0
Polish.....	88,937	49,616	79.2
Spanish.....	3,400	.....	.....
Yiddish.....	524,900	226,156	132.1
All other languages ¹	74,852	35,400	111.4

¹ A minus sign (-) denotes decrease.

² Includes for 1909, Arabic, Croatian, Danish and Norwegian, Finnish, Greek, Japanese-English, Slovak, Slovenian. In 1904, Arabic, Danish and Norwegian, Finnish, Norwegian, Slavonic, not specified, and Slovenian.

In 1909 German dailies had over two-fifths of the total circulation of dailies in foreign languages and the Yiddish followed with nearly one-third. The greatest percentages of increase (each over 150 per cent) were for Yiddish, Japanese, and Hungarian publications. The greatest circulation of Bohemian publications was reported by concerns in Illinois, of French publications, in Massachusetts, and of those in German, Hungarian, Italian, and Yiddish, in New York.

Sunday newspapers and periodicals.—Table 53 shows, by states and geographic divisions, comparative statistics for Sunday newspapers and periodicals published during 1909 and 1904.

DIVISION AND STATE.	Number.		Circulation.			
	1909	1904	1909	Per cent of total.	1904	Per cent of increase: ¹ 1904-1909
United States.....	520	494	13,347,282	100.0	12,022,341	11.0
NEW ENGLAND.....	29	26	1,267,440	9.5	1,047,420	21.0
Massachusetts.....	15	16	1,122,049	8.4	926,441	21.1
Connecticut.....	10	5	86,261	0.6	59,095	46.0
Maine and Rhode Island ²	4	5	59,130	0.5	61,884	-4.5
MIDDLE ATLANTIC.....	81	78	4,509,679	33.8	4,433,843	1.7
New York.....	48	44	2,957,727	22.2	3,061,565	-3.4
New Jersey.....	6	7	70,670	0.5	73,118	-3.3
Pennsylvania.....	27	27	1,481,282	11.1	1,299,160	14.0
EAST NORTH CENTRAL.....	106	105	2,855,912	21.4	2,651,242	7.7
Ohio.....	25	23	645,869	4.8	544,416	18.6
Indiana.....	20	21	206,176	1.6	365,180	-43.5
Illinois.....	38	40	1,616,506	12.1	1,442,721	12.0
Michigan.....	15	12	256,583	1.9	172,687	48.6
Wisconsin.....	8	9	120,778	1.0	126,238	3.6
WEST NORTH CENTRAL.....	64	67	1,649,780	12.4	1,475,300	11.8
Minnesota.....	7	10	237,205	1.8	190,304	24.6
Iowa.....	14	13	169,678	1.3	133,746	26.9
Missouri.....	21	24	978,377	7.3	970,071	0.9
Nebraska.....	8	8	129,050	1.0	99,779	29.3
Kansas.....	6	5	85,044	0.6	60,500	45.5
North Dakota and South Dakota ²	8	7	47,426	0.4	20,900	126.9
SOUTH ATLANTIC.....	55	57	751,231	5.6	589,247	27.5
Maryland.....	5	5	182,582	1.4	182,500	(³)
Virginia.....	8	10	79,258	0.6	62,688	26.4
West Virginia.....	7	6	44,939	0.3	36,962	21.6
North Carolina.....	7	8	39,281	0.3	35,091	11.9
South Carolina.....	4	6	32,447	0.2	24,617	31.8
Georgia.....	13	14	172,039	1.3	143,052	20.3
Florida.....	6	5	48,539	0.4	30,390	59.7
Delaware and District of Columbia ²	5	3	152,146	* 1.1	73,947	105.8
EAST SOUTH CENTRAL.....	35	33	414,052	3.1	274,576	50.8
Kentucky.....	12	10	115,855	0.8	83,115	39.4
Tennessee.....	7	9	183,196	1.4	125,905	45.5
Alabama.....	9	10	78,679	0.6	52,756	49.1
Mississippi.....	7	4	36,322	0.3	12,800	183.8
WEST SOUTH CENTRAL.....	56	43	583,028	4.4	450,472	29.4
Arkansas.....	7	7	50,593	0.4	24,337	107.0
Louisiana.....	8	8	152,920	1.1	159,183	-3.9
Oklahoma.....	11	8	77,326	0.6	43,802	76.5
Texas.....	30	20	302,189	2.3	223,150	35.4
MOUNTAIN.....	39	32	362,439	2.7	313,113	15.8
Montana.....	7	5	48,088	0.4	34,111	41.0
Idaho.....	3	3	13,864	0.1	7,675	80.6
Colorado.....	13	14	223,008	1.7	222,854	0.1
Arizona.....	9	4	17,400	0.1	10,273	69.4
Utah.....	3	3	45,428	0.3	34,200	32.8
Wyoming, New Mexico, and Nevada ²	4	3	14,651	0.1	4,000	266.3
PACIFIC.....	55	53	953,721	7.1	787,128	21.2
Washington.....	13	9	243,663	1.8	130,161	87.2
Oregon.....	6	8	93,142	0.7	58,300	58.4
California.....	36	36	616,916	4.6	598,167	3.1

¹ A minus sign (-) denotes decrease.
² Can not be shown separately without disclosure of individual operations.
³ Less than one-tenth of 1 per cent.

The Sunday newspapers and periodicals include and are almost entirely made up of Sunday editions of dailies. At the census of 1899 the number was given as 567, but the circulation was included with that of the dailies (or weeklies if not connected with daily papers). No mention was made of Sunday publications in the reports of the census of 1889, but at the census of 1879 the number was stated to be 252, of which 113 were connected with daily newspapers. During the 30 years following the last-named census, Sunday publications not connected with dailies decreased more than 75 per cent in number, while those connected with dailies gained over 330 per cent.

In the United States as a whole the increase in the total number of Sunday newspapers and periodicals for the five-year period 1904-1909 was 26, and that in average circulation per issue, 1,324,941. The West North Central and South Atlantic divisions reported a decrease in number but an increase in circulation. The other divisions reported increases in both respects, and all save the Middle Atlantic and the East North Central divisions reported increased proportions of the total circulation. These two divisions, nevertheless, together reported 55.2 per cent of the total circulation of Sunday papers in 1909.

The aggregate number of copies reported for 1909 was great enough to furnish 202 copies for each 1,000 literate persons 10 years of age and over reported at the census of 1910.

Sunday newspapers and periodicals published by establishments issuing no daily newspaper numbered 32 in 1909 with a circulation of 460,749, as compared with 40 in 1904 with a circulation of 505,320. New York, Illinois, and New Jersey reported most of the circulation of this class of publications in 1909.

Of the 520 Sunday publications in 1909, 61, with an aggregate circulation of 927,008, were published in languages other than English. In 1904 such papers numbered 54 with a circulation of 915,492.

Table 54 shows the number and circulation of Sunday newspapers in 10 cities having a population of 400,000 or more inhabitants for 1904 and 1909.

CITY.	Number.		Average combined circulation per issue.			
	1909	1904	1909	1904	Per cent of increase: ¹ 1904-1909	
Total.....	102	101	8,290,707	7,621,363	8.8	
New York, N. Y.....	32	30	2,744,990	2,639,348	4.0	
Chicago, Ill.....	15	16	1,473,597	1,344,071	9.6	
Philadelphia, Pa.....	13	13	1,052,052	952,847	10.4	
St. Louis, Mo.....	7	7	670,101	611,405	9.6	
Boston, Mass.....	4	5	992,332	835,046	18.8	
Cleveland, Ohio.....	5	4	186,340	137,281	35.7	
Baltimore, Md.....	6	6	184,378	184,500	(²)	
Pittsburgh, Pa.....	6	7	385,305	307,526	25.3	
Buffalo, N. Y.....	7	6	241,876	220,687	9.6	
San Francisco, Cal.....	7	7	359,736	388,652	-7.4	

¹ A minus sign (-) denotes decrease.
² Decrease less than one-tenth of 1 per cent.

A comparison of Table 54 with Table 47 shows that the Sunday publications in cities of 400,000 population and over increased at a lower rate, both in number and aggregate circulation, from 1904 to 1909, than the dailies exclusive of Sunday publications. The former class of periodicals increased 1 per cent in number and 8.8 per cent in circulation during the five years mentioned, while the dailies increased 7.3 per cent in number and 14.7 per cent in circulation during the same period. No doubt the growth in the circulation of the Sunday publications issued in these large cities has been checked to some extent by the establishment of Sunday newspapers in smaller places. The only cities, however, to report an actual loss in circulation of Sunday publications were San Francisco and Baltimore.

Weeklies.—A weekly "newspaper" is a publication issued once a week and giving general and political news and family reading. It may or may not be published in connection with a daily.

A weekly "periodical" is a publication issued once a week and devoted chiefly to purposes other than the spread of general and political news. The list includes all the "popular" weeklies of large circulation. Some of these contain reviews of current news and political matter, but they are not ordinarily considered as "newspapers." All religious and college weeklies are classed as "periodicals;" also such publications as are devoted to a certain specific interest, as, for instance, agriculture, commerce, fraternal organizations, labor, or science.

Table 55 shows, by states and geographic divisions, the number and circulation of weekly newspapers and periodicals for 1909 and 1904. Papers published on Sundays exclusively are not here included. In Table 41, however, the statistics of all weekly publications, including weeklies published on Sunday, are shown for the United States as a whole for 1909, 1904, and 1899.

Over three-tenths of the circulation of weeklies in 1909 was reported from the states of the Middle Atlantic division, those of the East North Central following with over one-fourth. The Mountain division had the least of all, 1.8 per cent. Among the individual states New York reported nearly one-sixth of the total circulation and Nevada less than one-tenth of 1 per cent of it. Decreases in circulation are shown for 15 states, these ranging from 1.9 per cent in Arkansas to 24.3 per cent in Vermont.

The greatest absolute increase in circulation between

1904 and 1909 by any division was 1,458,123, for the Middle Atlantic division, and the greatest increase by any state (1,419,808) for New York. In general, the highest percentages of increase were shown for the states of the Mountain division.

Table 55

DIVISION AND STATE.	WEEKLY NEWSPAPERS AND PERIODICALS.				
	Number.		Circulation.		
	1909	1904	1909	1904	Percent of increase: 1904-1909
United States	15,097	15,006	40,822,865	36,226,717	12.7
NEW ENGLAND	590	696	2,500,606	2,116,929	18.1
Maine.....	37	92	186,616	197,485	-5.5
New Hampshire.....	66	104	141,287	146,390	-3.5
Vermont.....	67	82	92,355	122,049	-24.3
Massachusetts.....	271	309	1,911,486	1,445,984	32.2
Rhode Island.....	21	29	34,013	39,542	-14.0
Connecticut.....	78	80	134,849	165,479	-18.5
MIDDLE ATLANTIC	2,069	2,138	12,458,495	11,000,372	13.2
New York.....	975	981	6,756,243	5,336,435	26.6
New Jersey.....	247	270	383,231	381,246	0.5
Pennsylvania.....	847	887	5,319,021	5,282,691	0.7
EAST NORTH CENTRAL	3,272	3,538	10,466,986	9,908,413	5.6
Ohio.....	699	781	2,913,730	2,747,511	6.0
Indiana.....	517	560	781,866	891,634	-12.3
Illinois.....	1,018	1,089	5,008,590	4,592,043	9.1
Michigan.....	526	570	750,298	774,758	-3.2
Wisconsin.....	512	538	1,012,502	902,467	12.2
WEST NORTH CENTRAL	3,925	3,838	7,575,538	6,308,999	20.1
Minnesota.....	614	634	1,269,856	1,151,145	10.3
Iowa.....	784	864	1,419,709	1,167,294	21.6
Missouri.....	731	730	1,871,585	1,739,457	7.6
North Dakota.....	310	212	259,675	175,543	47.9
South Dakota.....	360	263	277,127	198,604	39.5
Nebraska.....	521	535	1,074,554	861,840	24.7
Kansas.....	605	600	1,403,632	1,015,146	38.2
SOUTH ATLANTIC	1,116	1,112	2,067,315	1,922,075	7.6
Delaware.....	23	24	25,950	29,815	-13.0
Maryland.....	120	139	185,554	228,001	-18.6
District of Columbia.....	15	24	185,246	213,500	-13.2
Virginia.....	161	149	392,106	352,856	11.1
West Virginia.....	156	166	187,822	213,975	-12.2
North Carolina.....	178	157	395,682	263,091	60.4
South Carolina.....	90	103	133,240	137,439	-3.1
Georgia.....	246	233	423,897	371,274	14.2
Florida.....	127	117	137,818	112,124	22.9
EAST SOUTH CENTRAL	810	807	1,905,125	1,601,662	18.9
Kentucky.....	226	230	481,957	466,926	3.2
Tennessee.....	223	230	923,431	753,290	22.6
Alabama.....	179	171	278,245	213,543	30.3
Mississippi.....	182	176	221,492	167,903	31.9
WEST SOUTH CENTRAL	1,602	1,391	1,894,359	1,605,514	18.0
Arkansas.....	234	232	241,413	246,118	-1.9
Louisiana.....	141	143	176,193	172,949	1.9
Oklahoma.....	499	387	512,229	352,013	45.5
Texas.....	728	629	964,524	834,434	15.6
MOUNTAIN	774	621	742,136	595,358	24.7
Montana.....	101	69	92,027	75,463	21.9
Idaho.....	108	74	91,134	51,265	77.8
Wyoming.....	65	36	39,227	28,060	39.8
Colorado.....	278	274	338,092	294,242	14.9
New Mexico.....	86	53	62,826	38,865	61.7
Arizona.....	41	38	24,675	30,286	-18.5
Utah.....	65	57	71,542	65,742	8.3
Nevada.....	40	20	22,613	11,435	97.8
PACIFIC	939	865	1,212,405	1,167,395	3.9
Washington.....	263	226	252,396	217,845	15.9
Oregon.....	176	152	220,585	180,395	27.3
California.....	495	487	730,424	769,155	-5.0

¹ A minus sign (-) denotes decrease.

Separate statistics for weekly "newspapers" and weekly "periodicals" are available only for 1909 and 1904. These are presented by states in Table 56.

The circulation of the weekly periodicals, as reported at the census of 1909, was 48.7 per cent of the combined circulation of weekly newspapers and pe-

riodicals; at the census of 1904 it was 48.1 per cent. The increase in the circulation of the periodicals was 14.1 per cent, as compared with 11.4 per cent for the newspapers. The absolute increase was also greater for periodicals, although they decreased 299 in number, while the newspapers increased 390.

Table 56

STATE.	NUMBER OF WEEKLY—				AVERAGE COMBINED CIRCULATION PER ISSUE.					
	Periodicals.		Newspapers.		Periodicals.		Per cent of increase: 1 1904-1909	Newspapers.		Per cent of increase: 1 1904-1909
	1909	1904	1909	1904	1909	1904		1909	1904	
United States.....	1, 194	1, 493	13, 903	13, 513	19, 878, 630	17, 418, 168	14.1	20, 946, 335	16, 808, 551	11.4
California.....	61	87	434	400	254, 521	289, 828	-12.2	475, 903	479, 327	-0.7
Illinois.....	121	160	897	929	3, 159, 772	3, 199, 712	-1.2	1, 848, 818	1, 392, 331	32.8
Indiana.....	19	39	498	521	206, 060	213, 568	-3.6	676, 806	678, 066	-15.1
Iowa.....	27	36	757	828	565, 962	279, 000	102.9	853, 747	888, 294	-3.9
Kansas.....	21	14	684	596	212, 705	66, 290	220.9	1, 190, 327	949, 856	25.4
Kentucky.....	22	32	204	198	188, 350	194, 700	-3.3	293, 607	272, 228	7.9
Massachusetts.....	54	62	217	247	1, 483, 153	1, 103, 915	34.4	428, 333	342, 069	25.2
Michigan.....	26	31	600	539	171, 602	149, 532	14.8	678, 696	625, 226	-7.4
Minnesota.....	27	37	597	597	161, 665	241, 398	-39.0	1, 108, 191	809, 747	21.8
Missouri.....	58	65	673	665	833, 358	507, 319	15.0	1, 238, 227	1, 232, 138	4.6
Nebraska.....	21	28	500	507	164, 950	271, 918	-39.3	909, 604	589, 922	54.2
New York.....	223	243	732	738	5, 090, 589	3, 716, 951	37.0	1, 685, 654	1, 619, 434	2.8
North Carolina.....	19	22	159	135	165, 408	88, 400	87.1	230, 272	174, 891	31.8
Ohio.....	86	108	613	673	1, 687, 358	1, 380, 655	21.3	1, 226, 372	1, 356, 858	-9.6
Pennsylvania.....	132	150	715	737	3, 920, 143	3, 896, 792	0.6	1, 398, 878	1, 385, 999	0.9
Tennessee.....	25	42	198	188	486, 896	377, 460	29.0	636, 535	375, 930	16.2
Texas.....	28	39	700	590	207, 450	212, 250	-2.3	457, 074	622, 184	21.7
Virginia.....	15	17	148	132	193, 367	167, 700	15.3	198, 739	185, 156	7.3
Wisconsin.....	12	27	600	611	187, 036	245, 736	-32.0	845, 466	656, 731	28.7
All other states.....	197	254	4, 269	3, 792	806, 287	805, 042	0.2	4, 636, 082	4, 073, 618	13.8

¹ A minus sign (-) denotes decrease.

The concentration of weekly periodicals is shown in the statement that five states reported 77.2 per cent of the total circulation. These states are Illinois, Massachusetts, New York, Ohio, and Pennsylvania. Among all the states New York showed the greatest absolute gain (1,373,638) and Kansas the greatest percentage of gain (220.9 per cent).

Table 57 shows for 1909 the number and circulation of weekly periodicals other than newspapers, classified according to character, and the per cent distribution of the total circulation.

Table 57

CHARACTER.	Number: 1909	CIRCULATION OF WEEKLY PERIODICALS: 1909	
		Average, combined per issue.	Per cent of total.
Total.....	1, 194	19, 878, 630	100.0
Religious.....	483	8, 544, 673	43.0
Agricultural, horticultural, dairy, stock raising, etc.....	92	2, 351, 368	11.8
Commerce, finance, insurance, railroads, etc.....	84	340, 819	1.7
Trade journals.....	195	1, 041, 735	5.2
General literature.....	52	5, 799, 136	29.2
Medicine and surgery.....	7	105, 811	0.5
Law.....	19	47, 843	0.2
Science and mechanics.....	23	286, 478	1.5
Fraternal organizations.....	69	454, 930	2.3
Education and history.....	14	397, 962	2.0
Society, art, music, fashions, etc.....	49	269, 945	1.4
College and school periodicals.....	65	72, 460	0.4
Miscellaneous.....	42	160, 470	0.8

Religious publications contributed over two-fifths of the total circulation, those devoted to general literature being second with almost three-tenths.

Table 58 shows, by states, the number and circulation of weeklies printed in languages other than English for 1909 and 1904.

The circulation of weeklies printed in languages other than English was 8.7 per cent of the total circulation of all weeklies in 1909, compared with 8.2 per cent in 1904.

Table 58

STATE.	WEEKLY NEWSPAPERS AND PERIODICALS IN LANGUAGES OTHER THAN ENGLISH.				
	Number.		Average combined circulation per issue.		Per cent of increase: 1 1904-1909
	1909	1904	1909	1904	
United States.....	875	788	2, 543, 898	2, 876, 995	19.4
Alabama.....	3	3	5, 200	1, 900	173.7
Arkansas.....	3	3	3, 900	3, 200	18.8
California.....	30	29	36, 178	42, 642	-15.2
Colorado.....	14	9	54, 385	22, 600	140.6
Connecticut.....	10	11	21, 750	27, 741	-21.6
Illinois.....	95	81	559, 617	543, 314	3.0
Indiana.....	9	20	10, 750	27, 490	-60.9
Iowa.....	42	45	108, 583	83, 675	29.8
Kansas.....	11	8	18, 567	11, 830	56.9
Louisiana.....	7	5	22, 000	23, 989	-8.3
Maryland.....	9	9	20, 336	19, 970	1.8
Massachusetts.....	29	22	94, 106	53, 880	74.8
Michigan.....	30	34	72, 957	75, 280	-3.1
Minnesota.....	43	51	357, 589	384, 478	-7.0
Missouri.....	26	24	111, 218	71, 500	55.5
Nebraska.....	34	27	374, 112	210, 402	77.8
New Jersey.....	32	26	61, 407	60, 490	1.5
New Mexico.....	19	12	28, 015	15, 150	71.7
New York.....	94	71	417, 494	380, 450	9.7
North Dakota.....	10	9	22, 490	16, 480	36.5
Ohio.....	69	60	369, 814	298, 355	24.0
Oklahoma.....	5	5	5, 276	8, 076	-34.7
Oregon.....	5	5	32, 900	24, 000	37.1
Pennsylvania.....	69	64	186, 239	182, 289	2.2
Rhode Island.....	3	4	5, 400	4, 400	22.7
South Dakota.....	12	9	32, 200	16, 056	100.5
Texas.....	41	27	77, 321	48, 342	59.9
Utah.....	4	5	4, 900	7, 050	-30.5
Washington.....	16	12	24, 625	30, 290	-18.7
Wisconsin.....	73	77	358, 819	238, 676	50.3
All other states ²	28	21	47, 850	43, 030	11.2

¹ A minus sign (-) denotes decrease.

² Includes the following: For 1909, Arizona, 6 publications; Delaware, 1; District of Columbia, 1; Florida, 4; Georgia, 3; Kentucky, 2; Maine, 1; Montana, 2; New Hampshire, 1; South Carolina, 1; Tennessee, 2; Virginia, 1; West Virginia, 2; Wyoming, 1; and for 1904, Arizona, 2 publications; District of Columbia, 1; Florida, 2; Georgia, 1; Kentucky, 3; Maine, 3; Montana, 1; New Hampshire, 1; Tennessee, 4; Virginia, 2; West Virginia, 1.

The decreases in circulation shown in several states involved principally publications in German and Swedish. Taking the country as a whole, however, the circulation of the weekly German publications increased. In Oklahoma the decrease was in the circulation of publications in Choctaw and Cherokee-English. Table 59 shows the total circulation of weekly publications in languages other than English.

Table 59

LANGUAGE.	WEEKLY NEWSPAPERS AND PERIODICALS IN LANGUAGES OTHER THAN ENGLISH, AGGREGATE CIRCULATION PER ISSUE.	
	1909	1904
United States.....	3,543,898	2,976,995
Bohemian.....	67,950	67,014
Croatian.....	7,000	4,350
Danish.....	65,950	50,325
Dutch.....	42,850	39,035
Finnish.....	30,950	35,786
French.....	66,283	79,119
German.....	1,668,369	1,417,172
Hungarian.....	11,275	14,800
Italian.....	219,475	168,850
Lithuanian.....	30,100	19,239
Norwegian.....	207,676	206,029
Polish.....	283,820	236,890
Portuguese.....	14,050	8,400
Slovenian.....	11,035	4,500
Spanish.....	82,235	23,200
Swedish.....	449,944	462,909
Yiddish.....	91,160	75,586
All other ¹	188,776	63,791

¹ Armenian, Chinese, Estonian, Gaelic, Greek, Hebrew, Indian-English (Chinook), Irish-English, Japanese, Roumanian, Russian, Ruthenian, Servian, Slavish, Slavonic, Slovak, Syrian, and Welsh.

In 1909 the state of Nebraska led in aggregate circulation of weekly publications in German and in Danish; Minnesota led in the publications in Finnish and Norwegian; Michigan in Dutch; Louisiana in French; Ohio in Hungarian; New York in Italian and Yiddish; Illinois in Lithuanian, Polish, Slovenian, and Swedish; California in Portuguese; and New Mexico in Spanish.

Publications with miscellaneous periods of issue.—Table 60 shows, by states and geographic divisions, the number of publications for 1909 issued triweekly, semiweekly, monthly, quarterly, and at "all other" periods.

The East North Central division reported more semiweeklies and triweeklies than were reported from any other division. The Middle Atlantic division led in the number of monthly and of quarterly publications. More triweeklies and monthlies were published in New York than in any other state, but in the pub-

lication of quarterlies Pennsylvania was first among the states, New York and Illinois being second and third, respectively.

Table 60

DIVISION AND STATE.	NUMBER OF PUBLICATIONS, 1909, ISSUED—				
	Semi-weekly.	Tri-weekly.	Monthly.	Quarterly.	At all other periods, except daily, Sunday, and weekly.
United States.....	635	73	2,491	361	364
NEW ENGLAND.....	21	5	164	36	25
Maine.....	2	1	22	1	1
New Hampshire.....	2	1	4	.....	.....
Vermont.....	.....	.....	5	.....	1
Massachusetts.....	5	3	107	31	19
Rhode Island.....	3	.....	8	.....	1
Connecticut.....	9	.....	18	4	3
MIDDLE ATLANTIC.....	97	16	800	156	94
New York.....	46	10	521	54	68
New Jersey.....	4	1	26	6	6
Pennsylvania.....	47	5	253	97	21
EAST NORTH CENTRAL.....	177	18	622	98	91
Ohio.....	54	6	152	37	24
Indiana.....	29	1	52	2	6
Illinois.....	43	5	289	50	45
Michigan.....	28	6	73	4	8
Wisconsin.....	23	.....	56	5	8
WEST NORTH CENTRAL.....	98	8	332	22	66
Minnesota.....	8	.....	68	2	17
Iowa.....	50	4	66	4	14
Missouri.....	13	.....	117	12	18
North Dakota.....	1	.....	5	.....	1
South Dakota.....	1	.....	11	2	3
Nebraska.....	14	2	35	1	8
Kansas.....	9	2	30	1	5
SOUTH ATLANTIC.....	78	7	168	19	29
Delaware.....	.....	.....	8	.....	.....
Maryland.....	2	1	13	2	2
District of Columbia.....	.....	.....	28	5	6
Virginia.....	10	2	28	7	10
West Virginia.....	6	.....	10	.....	1
North Carolina.....	23	.....	15	4	6
South Carolina.....	20	1	8	1	1
Georgia.....	14	3	51	.....	3
Florida.....	3	.....	5	.....	.....
EAST SOUTH CENTRAL.....	44	4	86	21	20
Kentucky.....	23	4	28	2	9
Tennessee.....	10	.....	49	19	6
Alabama.....	6	.....	4	.....	3
Mississippi.....	5	.....	5	.....	2
WEST SOUTH CENTRAL.....	39	2	104	4	16
Arkansas.....	5	.....	12	1	.....
Louisiana.....	6	1	16	.....	3
Oklahoma.....	1	.....	12	.....	3
Texas.....	27	1	64	3	10
MOUNTAIN.....	30	6	53	.....	5
Montana.....	8	.....	5	.....	1
Idaho.....	5	1	.....	.....	.....
Wyoming.....	5	.....	4	.....	.....
Colorado.....	6	.....	31	.....	1
New Mexico.....	1	.....	2	.....	.....
Arizona.....	.....	.....	3	.....	1
Utah.....	5	3	8	.....	2
Nevada.....	.....	2	.....	.....	.....
PACIFIC.....	51	7	164	5	18
Washington.....	10	.....	32	.....	6
Oregon.....	10	1	27	1	2
California.....	31	6	105	4	11

Table 61 shows, by states and geographic divisions, the circulation of triweekly and semiweekly publications for 1909, 1904, and 1899.

DIVISION AND STATE.	TRIWEEKLIES AND SEMIWEEKLIES— AVERAGE COMBINED CIRCULATION PER ISSUE.		
	1909	1904	1899
United States.....	2,648,308	3,233,858	3,061,478
NEW ENGLAND.....	69,128	99,444	99,907
Maine, New Hampshire and Vermont..	16,479	27,140	31,378
Massachusetts.....	23,225	38,025	32,350
Rhode Island.....	5,810	6,719	6,854
Connecticut.....	23,612	27,560	29,325
MIDDLE ATLANTIC.....	502,266	834,711	899,290
New York and New Jersey.....	259,177	387,372	608,942
Pennsylvania.....	243,089	467,339	290,348
EAST NORTH CENTRAL.....	447,297	640,496	840,772
Ohio.....	131,806	113,749	224,461
Indiana.....	51,978	55,965	77,185
Illinois.....	138,165	177,213	176,058
Michigan.....	82,640	99,339	200,073
Wisconsin.....	42,708	194,230	162,995
WEST NORTH CENTRAL.....	598,722	921,393	701,657
Minnesota.....	37,062	63,396	60,660
Iowa.....	156,926	188,630	187,896
Missouri.....	353,481	590,203	329,353
North Dakota and South Dakota.....	5,013	11,910	8,700
Nebraska.....	31,085	24,730	54,208
Kansas.....	15,155	42,524	20,840
SOUTH ATLANTIC.....	438,386	199,813	129,048
Delaware, Maryland, and District of Columbia.....	18,075	17,755	20,060
Virginia.....	16,789	17,000	16,130
West Virginia.....	7,080	7,635	4,900
North Carolina.....	55,891	38,909	24,490
South Carolina.....	44,622	28,401	23,527
Georgia and Florida.....	295,929	90,113	39,941
EAST SOUTH CENTRAL.....	93,478	57,611	141,697
Kentucky.....	61,248	41,058	127,375
Tennessee and Alabama.....	26,230	12,503	12,740
Mississippi.....	6,000	4,050	1,582
WEST SOUTH CENTRAL.....	292,313	260,994	149,575
Arkansas.....	5,868	6,200	12,285
Louisiana and Oklahoma.....	20,629	26,885	35,898
Texas.....	265,816	227,909	101,392
MOUNTAIN.....	75,202	77,465	52,550
Montana.....	13,180	11,200	9,380
Idaho.....	7,185	11,850	4,645
Wyoming.....	9,315	7,677	1,485
Colorado and New Mexico.....	8,109	5,301	2,500
Utah and Nevada.....	37,413	41,427	34,540
PACIFIC.....	131,518	141,741	46,982
Washington.....	59,937	85,811	8,350
Oregon.....	26,725	27,330	14,810
California.....	44,856	28,600	23,822

Triweeklies and semiweeklies.—The reduction in circulation of triweeklies and semiweeklies is due in part to the abandonment of semiweekly editions of certain dailies and in part to a decrease in average number of copies reported by some of the others.

Monthlies.—Table 62 shows, by states and geographic divisions, the circulation of monthly publications for 1909, 1904, and 1899.

Among the monthlies are many magazines of large circulation; the circulation of such publications increased both from 1899 to 1904 and from 1904 to 1909.

The great decrease of 2,661,775 in circulation shown for Maine from 1904 to 1909 was due principally to the abandonment of two large lines of publications which had large circulations. An allusion to some of these

publications was made in the census special report on "Printing and publishing" for 1904, page 57:

The prominence of the state of Maine in monthly circulation has long been an interesting development in the production of this class of periodicals * * *. Magazines were published in very large editions and at such low subscription rates that they commended themselves to the people of the most moderate resources, especially in remote rural districts. By using the cheapest grades of paper and making small expenditure for literary matter, the cost of production was reduced so low that a profit was secured even upon a subscription price varying from 10 to 25 cents per annum.

Some of these publications are still in existence.

DIVISION AND STATE.	MONTHLY PUBLICATIONS—AVERAGE COMBINED CIRCULATION PER ISSUE.		
	1909	1904	1899
United States.....	83,280,535	64,308,155	37,863,897
NEW ENGLAND.....	6,833,681	11,144,738	8,466,732
Maine.....	3,960,766	6,622,541	6,120,490
New Hampshire.....	9,600	64,500	5,250
Vermont.....	28,500	15,900	35,250
Massachusetts.....	2,789,665	4,374,209	2,257,142
Rhode Island and Connecticut.....	45,150	67,588	48,600
MIDDLE ATLANTIC.....	31,900,048	32,938,941	18,552,791
New York.....	25,635,615	28,217,126	15,277,062
New Jersey.....	156,862	336,129	28,950
Pennsylvania.....	6,107,571	4,385,686	3,246,779
EAST NORTH CENTRAL.....	14,550,220	11,512,571	6,382,698
Ohio.....	2,685,470	2,006,287	1,420,501
Indiana.....	976,962	1,288,928	715,292
Illinois.....	9,492,099	6,344,791	3,072,932
Michigan.....	927,601	1,372,519	984,025
Wisconsin.....	468,088	500,046	189,948
WEST NORTH CENTRAL.....	6,247,642	5,965,219	2,751,055
Minnesota.....	824,955	956,696	452,329
Iowa.....	1,490,861	846,256	301,205
Missouri.....	2,265,275	3,365,168	1,378,586
North Dakota and South Dakota.....	49,750	78,230	41,950
Nebraska.....	684,513	399,444	255,935
Kansas.....	932,288	319,425	321,050
SOUTH ATLANTIC.....	1,285,399	903,818	656,315
Delaware and Maryland.....	117,319	130,300	99,400
District of Columbia.....	518,784	414,530	354,050
Virginia.....	183,605	167,448	96,890
West Virginia.....	21,550	14,620	6,400
North Carolina.....	40,265	30,750	12,050
South Carolina.....	10,504	7,918	8,000
Georgia.....	386,337	120,927	67,425
Florida.....	7,035	17,325	12,100
EAST SOUTH CENTRAL.....	666,363	409,238	546,010
Kentucky.....	136,995	142,550	282,450
Tennessee.....	517,643	247,143	270,150
Alabama.....	8,700	11,820	6,800
Mississippi.....	3,025	7,725	6,610
WEST SOUTH CENTRAL.....	456,346	303,272	100,100
Arkansas.....	136,750	45,330	18,900
Louisiana.....	23,671	16,216	14,750
Oklahoma.....	39,225	29,797	5,050
Texas.....	256,700	211,929	61,400
MOUNTAIN.....	339,961	405,941	102,948
Montana.....	13,800	7,700	6,495
Idaho and Wyoming.....	40,950	15,750	8,500
Colorado.....	230,308	348,815	72,947
New Mexico and Arizona.....	6,870	3,676	706
Utah and Nevada.....	48,033	30,000	14,300
PACIFIC.....	1,000,875	722,417	311,248
Washington.....	161,624	118,491	41,418
Oregon.....	219,351	81,400	75,038
California.....	619,900	522,526	194,792

The decrease in Massachusetts was 1,584,544 copies, due to the discontinuance of two publications in Boston for which a large circulation was reported at the census of 1904. One was devoted to fashions and the other to home topics and "general literature";

the annual subscription price in each case was low. The decrease in New York was 2,581,511 copies, and was reported in the main by publications in New York City treating of special topics relating to dress.

In 1909 over two-fifths of the aggregate circulation of monthly publications for the United States was reported from New York, Illinois ranking second with over one-seventh of the total.

Quarterlies.—Table 63 shows, by states, the circulation of the quarterly publications for 1909, 1904, and 1899.

DIVISION AND STATE.	QUARTERLY PUBLICATIONS—AVERAGE COMBINED CIRCULATION PER ISSUE.		
	1909	1904	1899
United States.....	16,058,089	11,709,655	11,087,422
Illinois.....	1,967,558	1,898,000	1,683,434
Massachusetts.....	1,401,844	445,581	363,096
Missouri.....	203,504	191,948	895,050
New York.....	2,437,289	909,317	2,126,625
Ohio.....	2,288,134	2,169,200	1,795,609
Pennsylvania.....	3,516,933	3,758,107	1,991,819
Tennessee.....	3,649,100	1,760,021	1,540,900
All other states.....	593,737	577,481	670,889

The circulation of publications issued four times a year increased 37.1 per cent from 1904 to 1909. The seven states shown separately in the table reported 96.3 per cent of this circulation in 1909.

A large part of the reported circulation of such periodicals is that of religious publications, and consists largely of Sunday-school lesson quarterlies. Tennessee led the states in the output of quarterly publications in 1909, followed closely by Pennsylvania, and then by New York and Ohio. Tennessee, Massachusetts, and Pennsylvania show great gains during the decade in circulation of these periodicals.

"All other."—This class of publications includes all issued at periods other than those already discussed. Among others, it embraces fortnightly, semimonthly, trimonthly, bimonthly, semiquarterly, semiannual, and annual publications. A number are published three, seven, nine, and ten times a year, such publications being for the most part devoted to "society, art, music, fashions," etc. Table 64 shows, by states, the circulation of these publications in 1909, 1904, and 1899.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning establishments engaged in the printing and publishing industry are presented, by states, in Tables 66 and 67.

Table 66 shows, for 1909, 1904, and 1899, the num-

DIVISION AND STATE.	PUBLICATIONS ISSUED AT "ALL OTHER" PERIODS—AVERAGE COMBINED CIRCULATION PER ISSUE.		
	1909	1904	1899
United States.....	4,093,874	2,878,504	5,546,329
Illinois.....	276,335	133,643	180,874
Iowa.....	110,010	56,975	44,990
Massachusetts.....	622,223	396,003	349,350
Minnesota.....	311,170	252,647	183,347
Missouri.....	280,796	149,555	219,465
New York.....	662,819	179,515	1,311,300
Ohio.....	545,279	383,247	390,900
Pennsylvania.....	82,134	154,225	142,041
Texas.....	58,281	16,400	10,250
Virginia.....	6,950	4,300	9,700
All other states.....	1,137,877	1,152,084	2,704,112

Language.—Table 65 shows, by states, the number and circulation of the foreign language periodicals issued triweekly, semiweekly, monthly, quarterly, and at "all other" periods for 1909 and 1904.

STATE.	TRIWEEKLY, SEMIWEEKLY, MONTHLY, QUARTERLY, AND "ALL OTHER" PERIODICALS IN FOREIGN LANGUAGES.				
	Number.		Average combined circulation per issue.		
	1909	1904	1909	1904	Per cent of increase: ¹ 1904-1909
United States.....	327	263	2,773,610	2,531,776	9.6
California.....	7	6	25,750	8,050	219.9
Illinois.....	47	37	421,826	247,151	70.7
Indiana.....	7	8	78,934	30,990	154.7
Iowa.....	15	12	152,049	167,835	-9.4
Massachusetts.....	13	6	264,732	104,352	153.7
Michigan.....	12	11	40,150	39,550	1.5
Minnesota.....	27	24	158,695	141,000	12.5
Missouri.....	19	14	281,876	112,115	151.4
Nebraska.....	9	5	81,625	303,334	-73.1
New York.....	55	58	527,186	841,627	-37.4
Ohio.....	42	33	317,461	222,442	42.7
Pennsylvania.....	14	20	89,935	68,918	30.5
Wisconsin.....	27	25	209,065	186,663	12.0
All other states ²	33	24	124,326	57,749	115.3

¹ A minus sign (-) denotes decrease.

² Includes, in 1909, Colorado, 3 publications; Connecticut, 1; Kansas, 2; Kentucky, 3; Maine, 1; Montana, 1; New Jersey, 1; New Mexico, 1; Oregon, 2; Rhode Island, 1; Tennessee, 2; Texas, 12; Vermont, 1; and Washington, 2. In 1904, Colorado, 2; Delaware, 2; Kansas, 2; Kentucky, 1; Montana, 1; New Hampshire, 2; New Jersey, 5; Oregon, 2; Rhode Island, 1; Texas, 3; Washington, 2; West Virginia, 1.

New York continued to have the greatest circulation despite a considerable decrease during the five-year period 1904-1909. German, German-English, German-English-French, Swedish, Spanish, Spanish-English, Spanish-Portuguese were among the leading languages.

ber of establishments, number of persons engaged in the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 67 gives detailed statistics for 1909 only.

PRINTING AND PUBLISHING—ALL BRANCHES COMBINED—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
West Virginia.....	1909	235	1,772	237	280	1,255	1,560	\$2,455	\$222	\$634	\$541	\$1,992	\$1,451
	1904	222	1,316	214	158	944	1,196	1,754	125	480	351	1,554	1,203
	1899	178	1,103	186	107	810	.....	1,148	83	334	226	1,035	809
Wisconsin.....	1909	833	7,860	864	1,636	5,360	5,293	10,763	1,505	2,913	3,386	11,861	8,475
	1904	767	7,036	800	1,137	5,099	5,064	8,020	1,009	2,435	2,642	9,252	6,610
	1899	636	.....	.....	533	4,413	.....	6,474	543	1,831	1,727	6,408	4,681
Wyoming.....	1909	65	275	60	53	162	138	437	54	141	90	490	400
	1904	47	186	38	29	119	96	266	33	84	52	313	261
	1899	40	.....	.....	6	94	.....	156	6	52	34	168	134
All other states.....	1904	32	584	25	80	419	318	1,065	93	293	249	954	705
	1899	24	.....	.....	47	356	.....	811	54	190	212	624	412

Table 67	STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.	
			Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Average number.	Wage earners.		Total.	16 and over.		Under 16.		
						Male.	Female.		Number, 15th day of—			Male.	Female.	Male.		Female.
									Maximum month.	Minimum month.						
1	United States.....	31,445	388,466	30,424	18,908	54,905	25,795	258,434	De 268,884	Jy 251,757	272,027	204,388	60,973	5,526	1,140	297,763
2	Alabama.....	274	1,955	299	163	307	69	1,117	De 1,162	Au 1,098	1,175	936	162	72	5	1,092
3	Arizona.....	64	408	51	22	58	9	268	De 287	Mh 259	285	256	15	14	.....	221
4	Arkansas.....	295	1,672	417	69	167	38	981	De 1,018	Je 952	1,041	791	216	34	.....	846
5	California.....	1,240	12,215	1,151	652	2,209	647	7,556	De 7,925	Ja 7,350	7,967	6,525	1,253	178	11	7,674
6	Colorado.....	439	3,747	406	184	625	166	2,366	De 2,483	My 2,307	2,508	2,048	401	54	5	2,045
7	Connecticut.....	363	4,103	295	232	506	192	2,878	Fe 2,944	Au 2,793	2,951	2,285	570	88	8	3,425
8	Delaware.....	48	406	32	22	46	18	288	Ap 2,977	Fe 2,799	3,155	218	76	19	2	305
9	District of Columbia.....	156	2,411	122	167	423	134	1,565	Mh 1,614	Au 1,478	1,600	1,303	290	7	.....	1,703
10	Florida.....	174	1,308	163	85	120	35	905	De 994	Ap 853	1,007	823	148	32	4	794
11	Georgia.....	442	3,849	422	285	547	200	2,395	De 2,483	Je 2,343	2,510	1,955	400	133	22	2,008
12	Idaho.....	132	758	160	44	65	21	468	De 501	Mh ¹ 453	505	431	56	18	.....	388
13	Illinois.....	2,608	43,074	2,384	2,026	6,573	3,447	28,644	Ap 29,892	Je 27,869	30,054	22,269	7,010	561	214	26,975
14	Indiana.....	892	9,600	865	447	1,021	511	6,756	Oc 6,889	Jy 6,610	6,930	4,858	1,919	141	12	17,868
15	Iowa.....	1,110	8,065	1,163	448	1,010	591	4,863	Jy 5,052	Jy 4,702	5,084	3,523	1,346	136	10	5,527
16	Kansas.....	798	4,903	879	191	351	250	3,232	De 3,413	Jy 3,135	3,428	2,299	1,072	46	11	4,868
17	Kentucky.....	431	4,577	391	302	529	220	3,135	De 3,202	Au 3,069	3,203	2,568	551	76	8	2,945
18	Louisiana.....	268	2,461	280	158	417	62	1,544	Fe 1,522	Je 1,537	1,600	1,354	167	78	1	1,494
19	Maine.....	195	2,359	155	120	146	287	1,651	Mh 1,789	Au 1,537	1,814	1,126	677	9	2	1,565
20	Maryland.....	371	4,942	365	229	751	211	3,386	De 3,530	Au 3,295	3,547	2,870	472	155	50	3,694
21	Massachusetts.....	1,279	24,410	1,089	946	2,723	2,120	17,532	De 18,158	Au 16,746	18,317	12,837	4,968	404	108	47,629
22	Michigan.....	1,045	11,048	991	547	1,620	671	7,219	De 7,576	Ap 7,070	7,532	5,539	1,890	94	9	7,651
23	Minnesota.....	960	9,078	1,036	434	1,289	678	5,641	De 5,905	Jy 5,613	6,270	4,626	1,585	57	2	5,765
24	Mississippi.....	225	1,132	249	75	52	20	736	De 765	My 712	776	634	103	38	1	496
25	Missouri.....	1,322	15,792	1,243	854	2,076	829	10,790	De 11,218	Jy 10,503	11,265	8,056	2,931	200	78	10,472
26	Montana.....	135	1,046	110	58	160	27	691	De 718	Ja 667	717	637	68	11	1	679
27	Nebraska.....	674	3,884	674	173	453	255	2,329	No 2,446	Ja 2,279	2,448	1,809	583	53	3	2,552
28	Nevada.....	54	276	48	20	16	12	180	Mh 195	Au ¹ 172	175	154	15	6	.....	214
29	New Hampshire.....	143	984	138	42	87	40	677	Fe 721	Au 646	710	485	210	14	1	1,865
30	New Jersey.....	684	7,364	647	301	745	220	5,451	No 5,732	Fe 5,245	5,789	4,717	954	103	15	5,636
31	New Mexico.....	93	436	84	35	26	8	283	De 289	Mh 277	283	227	42	12	2	1,230
32	New York.....	4,426	94,893	3,732	4,052	16,007	7,982	63,120	De 66,147	Jy 61,199	66,390	51,021	14,722	507	140	53,973
33	North Carolina.....	322	2,059	307	152	138	86	1,376	No 1,433	Je 1,336	1,422	1,123	173	121	5	1,119
34	North Dakota.....	330	1,294	333	59	81	33	788	De 822	Mh 769	832	644	144	36	8	948
35	Ohio.....	1,655	22,754	1,480	1,276	2,884	1,358	15,756	De 16,428	Jy 15,219	16,555	12,203	4,115	200	37	18,417
36	Oklahoma.....	598	2,945	661	160	352	74	1,698	De 1,831	Ja 1,626	1,875	1,497	326	52	.....	1,664
37	Oregon.....	324	2,523	514	124	307	119	1,459	De 1,505	Jy 1,424	1,528	1,279	219	25	5	1,927
38	Pennsylvania.....	2,461	36,783	2,557	1,781	5,132	2,617	24,696	De 25,938	Au 23,855	26,236	19,323	5,972	747	194	25,839
39	Rhode Island.....	147	2,049	139	91	271	94	1,454	De 1,570	Ja 1,411	1,570	1,112	421	36	1	1,944
40	South Carolina.....	161	1,294	171	80	167	42	834	My 848	Jy 816	851	668	128	52	3	603
41	South Dakota.....	392	1,387	359	58	84	61	825	De 858	Ja 794	878	609	246	23	.....	931
42	Tennessee.....	413	4,442	443	229	627	229	2,914	Se 3,011	Ja 2,799	3,043	2,339	614	88	2	2,965
43	Texas.....	1,067	7,177	1,159	425	984	201	4,408	De 4,791	Ap 4,274	4,824	3,875	670	254	25	4,392
44	Utah.....	122	1,475	91	78	276	63	967	De 1,004	Jy 925	1,017	858	136	23	.....	1,357
45	Vermont.....	115	919	109	45	55	44	666	De 699	Au 649	700	496	202	2	.....	625
46	Virginia.....	369	3,719	347	250	400	167	2,555	De 2,652	Jy 2,504	2,660	1,931	603	123	3	2,210
47	Washington.....	506	4,583	552	236	966	205	2,624	No 2,687	Ja 2,529	2,718	2,223	360	113	22	2,232
48	West Virginia.....	235	1,772	237	103	136	41	1,255	De 1,311	Fe 1,228	1,314	955	287	69	3	1,560
49	Wisconsin.....	833	7,860	864	349	905	382	5,360	De 5,632	Jy 5,246	5,638	3,878	1,449	204	107	5,293
50	Wyoming.....	65	275	60	29	15	9	162	Oc 170	Ja ¹ 158	170	126	36	8	.....	138

¹ Same number reported for one or more other months.

AUTOMOBILES, INCLUDING BODIES
AND PARTS

THE AUTOMOBILE INDUSTRY.

GENERAL STATISTICS.

Classification of establishments.—The statistics of the automobile industry as given in the present bulletin cover the operations of two classes of establishments: (1) Those which manufactured complete automobiles as their product of chief value, and (2) those in which the greater part of the value of products represented automobile bodies and parts. In the statistics for the industry as a whole a large amount of duplication is involved, as the greater part of the products of the establishments engaged primarily in the manufacture of bodies and parts were utilized as materials in the establishments that manufactured chiefly complete automobiles, and a number of these latter establishments, moreover, reported the manufacture for sale to other automobile manufacturers of considerable quantities of bodies and parts. The statistics for the factories which produce complete machines and those which manufacture bodies and parts do not, however, indicate the full extent and importance of the automobile industry, because of the large number of establishments in other industries which manufacture engines or motors, parts of machinery, tools, rubber tires, and other parts and accessories of automobiles. In the census reports many of these establishments are included under the classification "foundry and machine-shop products." The manufacture of automobile rubber tires constitutes part of a separate industry, and although a number of manufacturers of rubber goods reported the value of tires produced, the practice was not general and their total value, therefore, can not be definitely determined. Moreover, many automobile parts, particularly tires, manufactured by establishments not assigned to the classification now under discussion, are sold to dealers or to automobile owners, and do not enter into the value of products of the automobile industry as here presented.

Table 1 presents a summary of the statistics of the automobile industry for the United States as a whole for 1909.

Of the 743 establishments engaged in the manufacture of automobiles, including bodies and parts, in 1909, only 265 manufactured complete automobiles as their product of chief value, but these establishments employed more than two-thirds of the average number of wage earners engaged in the entire industry. The total value of products in the year 1909 for the two branches of the industry combined was \$249,202,075, of which \$193,823,108 was the value of products reported by the establishments engaged principally in

the manufacture of automobiles and \$55,378,967 that reported by establishments engaged principally in the manufacture of automobile bodies and parts. The total obtained by adding the figures for the two branches of the industry involves considerable duplication, as already explained. Probably a better measure of the actual value of the products of the automobile industry as a whole is found in the total value of the complete machines manufactured, which was \$164,269,324.

Of the 126,593 automobiles turned out by establishments of the industry in 1909, all but 23 were made in establishments reporting complete automobiles as the product of chief value. In addition to the automobiles manufactured by establishments assigned to this industry, 694 automobiles were reported by establishments engaged primarily in the manufacture of other products.

Table 1	Total. ¹	ESTABLISHMENTS MANUFACTURING PRINCIPALLY—	
		Automobiles.	Automobile bodies and parts.
Number of establishments.....	743	265	478
Persons engaged in the industry.....	85,359	58,142	27,217
Proprietors and firm members.....	405	83	322
Salaried employees.....	9,233	6,765	2,468
Wage earners (average number).....	75,721	51,294	24,427
Primary horsepower.....	75,550	50,641	24,909
Capital.....	\$173,837,111	\$134,592,965	\$39,244,146
Expenses.....	\$210,690,666	\$163,647,228	\$47,043,438
Services.....	\$58,173,291	\$39,854,578	\$18,318,713
Salaries.....	\$9,479,424	\$6,674,104	\$2,805,320
Wages.....	\$48,693,867	\$33,180,474	\$15,513,393
Materials.....	\$131,645,736	\$107,731,446	\$23,914,290
Miscellaneous.....	\$20,871,639	\$16,061,204	\$4,810,435
Value of products.....	\$249,202,075	\$193,823,108	\$55,378,967
Value added by manufacture (value of products less cost of materials).....	\$117,556,339	\$86,091,662	\$31,464,677
Automobiles made:			
Number.....	126,593	126,670	23
Value.....	\$164,269,324	\$164,203,524	\$65,800

¹ In addition, 694 automobiles, valued at \$830,080, and bodies and parts to the value of \$4,415,266, were reported by establishments engaged primarily in the manufacture of brass and bronze products, carriages and wagons, street-railroad cars, machinery, and other products.

An average value per automobile computed from the total number of those manufactured in 1909 would have but slight significance, because of the many sizes and varieties included in the total number. Even a computation of the average value for the different classes of machines for which separate statistics are presented is unsatisfactory for the same reason.

Comparison with earlier censuses.—Table 2 summarizes the statistics of the automobile industry (both branches combined) for the censuses of 1909, 1904, and 1899.

	AUTOMOBILES, INCLUDING BODIES AND PARTS.			
	Number or amount.			Percent of increase: 1904-1909
	1909	1904	1899 ¹	
Number of establishments.....	743	178	57	317.4
Persons engaged in the industry.....	85,359	13,333	(?)	540.2
Proprietors and firm members.....	405	103	(?)	293.2
Salaried employees.....	9,233	1,181	268	681.8
Wage earners (average number).....	75,721	12,049	2,241	528.4
Primary horsepower.....	75,550	10,109	3,164	647.4
Capital.....	\$173,837,111	\$23,083,860	\$5,768,857	653.1
Expenses.....	\$210,690,666	\$25,833,736	\$3,700,844	715.6
Services.....	\$58,173,291	\$8,416,217	\$1,615,428	591.2
Salaries.....	\$9,479,424	\$1,257,259	\$294,770	654.0
Wages.....	\$48,693,867	\$7,158,958	\$1,320,658	580.2
Materials.....	\$131,645,736	\$13,151,365	\$1,804,287	901.0
Miscellaneous.....	\$20,871,639	\$4,266,154	\$281,129	389.2
Value of products.....	\$249,202,075	\$30,033,536	\$4,748,011	729.7
Value added by manufacture (value of products less cost of materials).....	\$117,556,339	\$16,882,171	\$2,943,724	596.3
Automobiles made ²	126,593	21,692	3,723	483.6

¹ Establishments whose chief products were automobile bodies and parts were not included as a part of the industry until 1904.

² Figures not available.

³ In addition, 694 automobiles in 1909 and 1,138 automobiles in 1904 were reported by establishments engaged primarily in other industries.

The automobile industry is one of the most recent to be included in the census of manufactures, having been first reported separately at the census of 1904. At the census of 1899 the manufacture of automobiles was reported as a part of the carriage and wagon industry, but the returns of establishments engaged exclusively or primarily in the manufacture of automobiles have since been tabulated separately, and are presented in the comparative table as the statistics for the industry in 1899. The totals for that year do not include statistics for establishments whose chief products were automobile bodies and parts, but it is doubtful whether there were any such establishments at that time. In 1899 the industry was largely in the experimental stage, and that being the case, a com-

parison of the totals for 1899 with the statistics for the succeeding censuses is of no great significance. The statistics for the censuses of 1904 and 1909, however, are fairly comparable and indicate a remarkable growth of the industry during the intervening period, the value of products being more than eight times as great in 1909 as in 1904. It is probable, however, that the figures representing the value of products may exaggerate somewhat the real growth of the industry, because, as already explained, they involve duplication to the extent that the products of one branch of the industry reappear in the materials for the other branch. Because of the increase in the relative importance of the branch of the industry engaged principally in the production of automobile bodies and parts, this duplication would have more effect upon the later figures than upon the earlier. Statistics as to the number of wage earners and the value added by manufacture, considered as a measure of the growth of the industry as a whole, are free from this objection. In 1909 the number of wage earners was more than six times as great as it was in 1904 and the "value added" more than seven times as great. The increase in the number of automobiles manufactured is another measure of growth, the number in 1909 being very nearly six times the number in 1904.

Between 1904 and 1909 the manufacture of automobiles, including bodies and parts, advanced in rank among the manufacturing industries of the country from seventy-seventh place to twenty-first with respect to value of products and from seventieth to twentieth with respect to average number of wage earners.

Table 3 gives separate statistics for the two branches of the industry for 1909 and 1904, with percentages of increase.

	AUTOMOBILES.			AUTOMOBILE BODIES AND PARTS.		
	1909	1904	Per cent of increase.	1909	1904	Per cent of increase.
Number of establishments.....	265	121	119.0	478	57	738.6
Persons engaged in the industry.....	58,142	11,246	417.0	27,217	2,087	1,204.1
Proprietors and firm members.....	83	53	56.6	322	50	544.0
Salaried employees.....	6,765	954	609.1	2,468	227	987.2
Wage earners (average number).....	51,294	10,239	401.0	24,427	1,810	1,249.6
Primary horsepower.....	50,641	7,624	564.2	24,909	2,485	902.4
Capital.....	\$134,592,965	\$20,555,247	554.8	\$39,244,146	\$2,528,613	1,452.0
Expenses.....	\$163,647,228	\$22,859,832	615.9	\$47,043,438	\$2,973,854	1,481.9
Services.....	\$39,854,578	\$7,255,375	449.3	\$18,318,713	\$1,160,842	1,478.1
Salaries.....	\$6,674,104	\$1,076,425	520.0	\$2,805,320	\$180,834	1,451.3
Wages.....	\$33,180,474	\$6,178,950	437.0	\$15,513,393	\$980,008	1,488.0
Materials.....	\$107,731,446	\$11,658,138	824.1	\$23,914,290	\$1,493,227	1,501.5
Miscellaneous.....	\$16,061,204	\$3,946,369	307.0	\$4,810,435	\$319,785	1,404.3
Value of products.....	\$193,823,108	\$26,645,064	627.4	\$55,378,967	\$3,388,472	1,534.3
Value added by manufacture (value of products less cost of materials).....	\$36,091,662	\$14,986,926	474.4	\$31,464,677	\$1,895,245	1,560.2

The large relative increases shown for the period from 1904 to 1909 in the branch of the industry which reported automobiles as the chief product were in all cases greatly exceeded by those for the branch of the industry chiefly engaged in the manufacture of automobile bodies and parts. The average number of wage earners employed in the establishments in the automobile branch was about five times as great in 1909 as

in 1904, while the average number employed in establishments whose chief products were automobile bodies and parts was more than thirteen times as great in the later as in the earlier year. In 1909 the value of products was more than seven times the figure for 1904 in the automobile branch and more than sixteen times the figure for 1904 in the other branch of the industry.

Summary, by states.—Table 4 presents the more important statistics for the combined industry, by states, the states being arranged according to the value of products reported for 1909. Separate figures are given for 19 states, the statistics for the 9 other states in which the industry was carried on in 1909 being combined under the heading of "all other states"

to avoid the disclosure of the operations of individual establishments. It may be noticed that certain numbers are omitted in the several series of numbers showing the rank of the states in the industry. This is because there are certain states included with "all other states" which outrank some of the states for which separate figures are given.

Table 4

STATE.	AUTOMOBILES, INCLUDING BODIES AND PARTS.															
	Number of establishments: 1909	Wage earners.				Value of products.				Value added by manufacture.				Percent of increase: 1904-1909 ¹		
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).	Value of products.	Value added by manufacture.
				1909	1904			1909	1904			1909	1904			
United States.....	743	75,721	100.0			\$249,202,075	100.0			\$117,556,339	100.0			528.4	729.7	598.3
Michigan.....	113	25,444	33.6	1	1	96,651,451	38.8	1	1	42,769,030	36.4	1	1	841.3	1,108.6	839.2
Ohio.....	75	12,130	16.0	2	2	38,838,754	15.6	2	2	20,316,756	17.3	2	2	345.6	510.9	434.0
New York.....	113	9,861	13.0	3	3	30,979,527	12.4	3	3	16,071,425	13.7	3	3	433.3	627.2	583.0
Indiana.....	67	6,797	9.0	4	6	23,764,070	9.5	4	7	8,769,201	7.5	4	7	733.0	1,349.9	976.0
Connecticut.....	28	3,815	5.0	7	4	11,668,228	4.7	5	4	6,811,924	5.8	5	4	.....	.....	.....
Wisconsin.....	30	4,298	5.7	5	7	11,440,242	4.6	6	6	6,100,028	5.2	6	6	.....	.....	.....
Massachusetts.....	62	4,138	5.5	6	5	11,359,224	4.6	7	5	5,867,746	5.0	7	5	276.2	326.5	320.6
Illinois.....	65	2,382	3.1	9	9	7,153,818	2.9	8	9	3,174,699	2.7	8	9	1,326.3	1,908.9	1,195.9
Pennsylvania.....	44	3,199	4.2	8	8	6,531,733	2.6	9	8	2,480,880	2.1	9	8	465.2	432.8	297.0
New Jersey.....	24	1,024	1.4	10	10	2,007,516	0.8	11	10	1,115,339	0.9	11	10	.....	.....	.....
Missouri.....	17	368	0.5	13	11	1,676,840	0.7	12	11	651,696	0.5	13	11	.....	.....	.....
California.....	41	478	0.6	12	14	1,470,169	0.6	13	14	770,441	0.7	12	14	.....	.....	.....
Iowa.....	11	248	0.3	14	.....	580,106	0.2	14	.....	254,414	0.2	14	.....	.....	.....	.....
Maryland.....	5	202	0.3	15	.....	532,761	0.2	15	.....	247,646	0.2	15	.....	.....	.....	.....
Minnesota.....	11	130	0.2	16	17	429,286	0.2	16	15	175,993	0.2	17	15	.....	.....	.....
Colorado.....	4	82	0.1	18	.....	206,408	0.1	18	.....	147,585	0.1	18	.....	.....	.....	.....
Texas.....	4	56	0.1	19	.....	183,580	0.1	19	.....	62,152	0.1	20	.....	.....	.....	.....
Nebraska.....	6	18	(²)	21	.....	57,423	(²)	22	.....	29,176	(²)	23	.....	.....	.....	.....
Washington.....	5	14	(²)	23	.....	56,358	(²)	23	.....	33,888	(²)	22	.....	.....	.....	.....
All other states.....	18	1,037	1.4	.....	.....	3,614,581	1.4	.....	.....	1,706,320	1.5	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 22. Percentages are omitted where comparable figures can not be given or where base is less than 100 for wage earners, or less than \$100,000 for value of products or value added by manufacture.
² Less than one-tenth of 1 per cent.

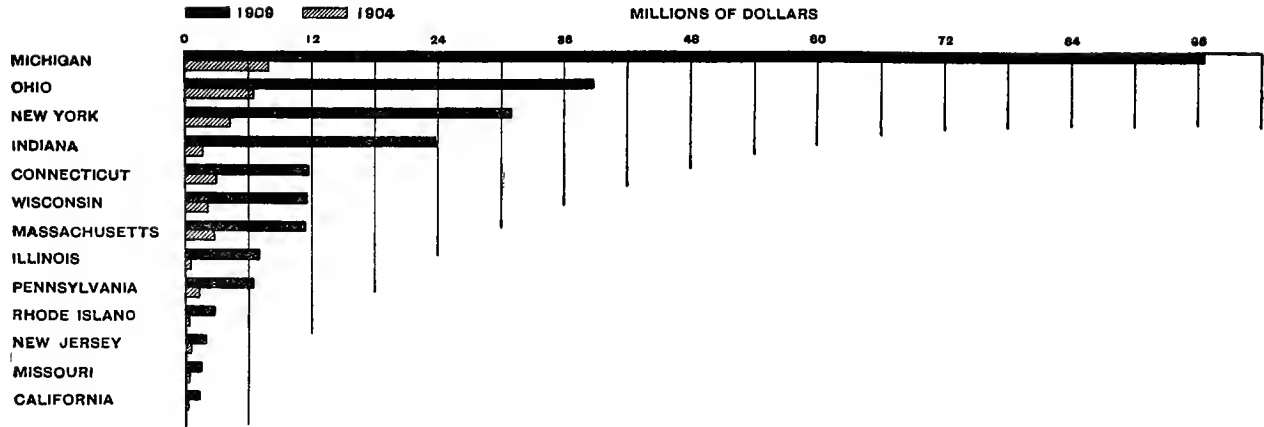
Michigan is the leading state in the industry, holding first rank at the censuses of 1909 and 1904 in respect to the average number of wage earners employed, the value of products, and the value added by manufacture. In 1909 the factories in Michigan reported 33.6 per cent of the average number of wage earners employed in the industry, 38.8 per cent of the value of products, and 36.4 per cent of the value added by manufacture. The average number of wage earners employed in establishments of the industry in this state and the value added by manufacture were more than nine times as great in 1909 as in 1904, while the gross value of products was more than twelve times as great in the later as in the earlier year. In 1909, 71.6 per cent of the wage earners, 76.3 per cent of the value of products, and 74.9 per cent of the value added by manufacture were reported from four states, namely, Michigan, Ohio, New York, and Indiana. In the case of each of the states for which separate figures

are given in the table, large percentages of increase are shown for every item for the period 1904-1909. Between 1904 and 1909 several changes took place in the rank of the different states as determined by value of products. The three leading states, Michigan, Ohio, and New York, in the order named, held the same rank at both censuses, as did Wisconsin, which ranked sixth. Indiana showed the most pronounced gain in rank, having advanced from seventh place in 1904 to fourth in 1909. Illinois became eighth instead of ninth, and California thirteenth instead of fourteenth. On the other hand, Massachusetts dropped from fifth place in 1904 to seventh in 1909, while Pennsylvania went from eighth to ninth.

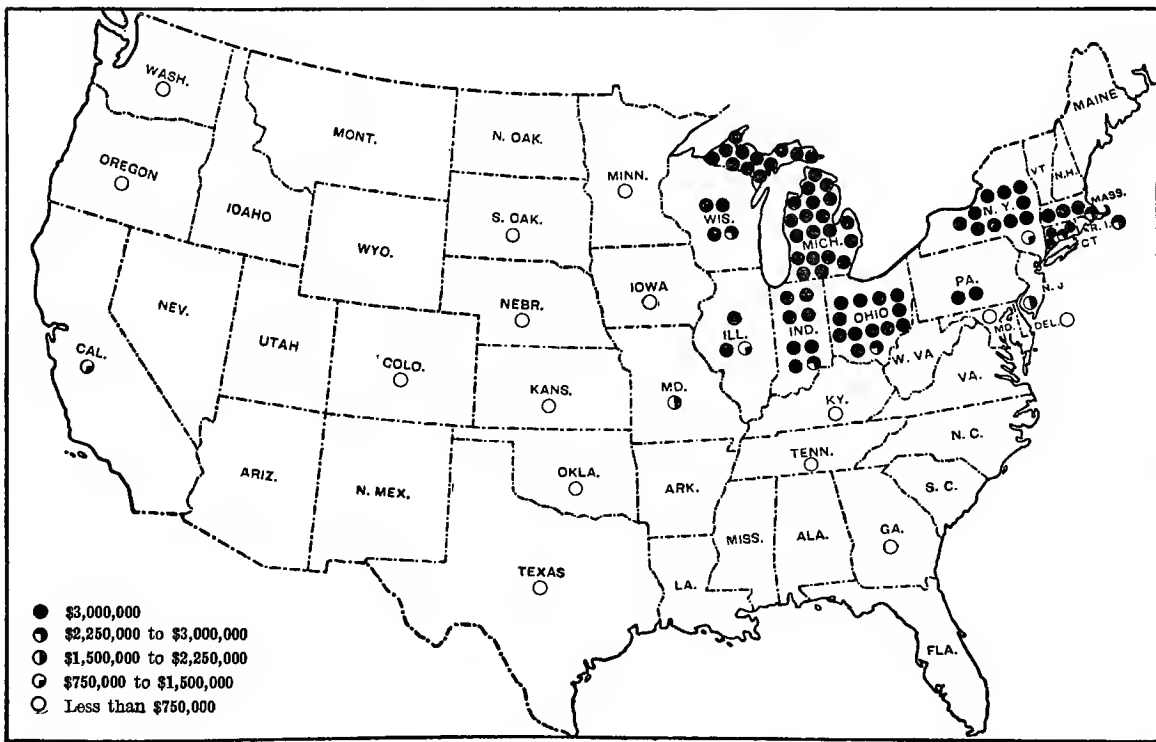
The following diagram shows graphically the value of products for the most important states in the industry in 1909 and 1904, while the map shows graphically the value of products in 1909 for each state from which the industry was reported for that year.

MANUFACTURES.

VALUE OF PRODUCTS FOR LEADING STATES: 1909 AND 1904.



VALUE OF PRODUCTS, BY STATES: 1909.



Persons engaged in the industry.—Table 5 shows, by classes, for 1909, the number of persons engaged in the industry. It should be borne in mind that the sex and age classification of the average number of wage earners in this and in other tables is an estimate obtained by the method described in the Introduction.

The total number of persons engaged in the industry in 1909 was 85,359, of whom 75,721, or 88.7 per cent, were wage earners, 2,564, or 3 per cent, proprietors and officials, and 7,074, or 8.3 per cent, clerks—the last named class including other subordinate salaried employees. Of the persons engaged in the industry in 1909, 82,918, or 97.1 per cent, were males and 2,441, or

2.9 per cent, were females. Among the latter, 1,652, or 67.7 per cent, were clerks and 768, or 31.5 per cent, were wage earners, while but 21, or nine-tenths of 1 per cent, were proprietors and officials. The average number of children under 16 years of age employed as wage earners in the industry in 1909 was 162, of whom 159 were males and 3 were females.

The average number of wage earners is given in Table 22, by states, for 1909, 1904, and 1899. The sex and age distribution of the average number of wage earners is not shown for the individual states, but Table 23 gives such a distribution of the number employed on December 15, 1909, or the nearest representative day.

Table 5

PERSONS ENGAGED IN THE INDUSTRY: 1909

BRANCH OF INDUSTRY AND CLASS OF PERSONS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
Automobiles, including bodies and parts.	85,359	82,918	2,441
Proprietors and officials.....	2,564	2,543	21
Proprietors and firm members.....	405	397	8
Salaried officers of corporations.....	758	748	10
Superintendents and managers.....	1,401	1,398	3
Clerks.....	7,074	5,422	1,652
Wage earners (average number).....	75,721	74,953	768
16 years of age and over.....	75,559	74,794	765
Under 16 years of age.....	162	159	3
Automobiles.....	58,142	56,541	1,601
Proprietors and officials.....	1,350	1,344	6
Proprietors and firm members.....	83	81	2
Salaried officers of corporations.....	371	369	2
Superintendents and managers.....	896	894	2
Clerks.....	5,498	4,275	1,223
Wage earners (average number).....	51,294	50,922	372
16 years of age and over.....	51,187	50,818	369
Under 16 years of age.....	107	104	3
Automobile bodies and parts.....	27,217	26,377	840
Proprietors and officials.....	1,214	1,199	15
Proprietors and firm members.....	322	316	6
Salaried officers of corporations.....	387	379	8
Superintendents and managers.....	505	504	1
Clerks.....	1,576	1,147	429
Wage earners (average number).....	24,427	24,031	396
16 years of age and over.....	24,372	23,976	396
Under 16 years of age.....	55	55	.....

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that shown at the census of 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 6.

Table 6

PERSONS ENGAGED IN THE INDUSTRY AS A WHOLE.

CLASS.	1909		1904		Per cent of increase: 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
	Total.....	85,359	100.0	13,333		100.0	540.2
Proprietors and firm members..	405	0.5	103	0.8	293.2
Salaried employees.....	9,233	10.8	1,181	8.9	681.8
Wage earners (average number).	75,721	88.7	12,049	90.4	528.4

Salaried employees increased in number at a greater rate than either of the other classes, forming a somewhat larger percentage of the total number of persons engaged in the industry in 1909 (10.8 per cent) than in 1904 (8.9 per cent). The percentage of increase in the average number of wage earners was much greater than that in proprietors and firm members, but the proportion which each of these classes represented of the total was smaller in the later than in the earlier year.

Table 7 shows the average number of wage earners employed in the industry, distributed according to age periods, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

Table 7

AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY AS A WHOLE.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
	Total.....	75,721	100.0	12,049	100.0	2,241	100.0
16 years of age and over.....	75,559	99.8	11,977	99.4	2,235	99.7
Male.....	74,794	98.8	11,937	99.1	2,231	99.5
Female.....	765	1.0	40	0.3	4	0.2
Under 16 years of age.....	162	0.2	72	0.6	6	0.3

Practically all the wage earners employed in the industry as a whole (98.8 per cent in 1909 and 99.1 per cent in 1904) were males 16 years of age and over. The proportion represented by females 16 years of age and over was somewhat higher in 1909 than at the preceding censuses, while the proportion represented by children under 16 years of age was somewhat lower in 1909 than in 1904. The numbers of women and children employed are, however, so small that the changes in the relative importance of these classes since 1904 have little significance.

Wage earners employed, by months.—Table 8 gives the number of wage earners employed in the manufacture of automobiles (including bodies and parts) on the 15th (or the nearest representative day) of each month during the year 1909 for the 10 states in which the average number of wage earners employed during the year exceeded 500.

Table 8

WAGE EARNERS EMPLOYED IN THE INDUSTRY AS A WHOLE: 1909¹

STATE.	A average number during the year.	MONTHS											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	75,721	82,724	68,808	71,142	73,752	75,481	78,176	78,549	78,488	77,445	77,280	82,956	89,886
Connecticut.....	3,815	<i>3,320</i>	3,454	3,587	3,690	3,719	3,671	3,596	3,761	4,047	4,003	4,348	4,586
Illinois.....	2,382	<i>2,252</i>	2,369	2,505	2,433	2,524	2,435	2,508	2,484	2,375	2,134	2,107	2,448
Indiana.....	6,797	<i>6,488</i>	6,020	6,427	6,582	6,710	6,666	6,378	6,485	6,349	7,437	8,197	8,825
Massachusetts.....	4,138	<i>3,538</i>	3,791	4,164	4,216	4,317	4,271	4,325	4,157	4,067	4,307	4,274	4,437
Michigan.....	25,444	<i>20,464</i>	21,893	23,474	24,788	26,085	26,842	28,642	29,006	27,011	23,404	25,419	28,302
New Jersey.....	1,024	<i>897</i>	919	956	963	953	1,035	1,047	1,048	1,026	1,081	1,149	1,211
New York.....	9,861	<i>8,917</i>	9,262	9,730	9,347	9,827	9,621	8,269	9,167	9,601	10,534	11,379	12,073
Ohio.....	12,130	<i>10,034</i>	10,680	11,118	11,381	11,217	11,191	11,674	12,135	12,494	13,394	14,542	15,700
Pennsylvania.....	3,199	<i>2,549</i>	2,410	2,571	2,766	2,962	3,304	3,477	3,500	3,678	3,637	3,781	3,953
Wisconsin.....	4,298	<i>3,482</i>	3,688	4,061	4,246	4,393	4,365	3,955	3,990	4,154	4,674	5,063	5,514

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The largest number of wage earners employed in the industry as a whole during any month of 1909 was 89,886 in December, and the smallest number 62,724, in January. Although the number of wage earners employed in January was equal to only 69.8 per cent of the number reported for December, the industry can not be classed as seasonal, the difference in employment during 1909 being due rather to the increasing demands made on the factories in the later months of the year. In 1904 in the automobile branch of the industry, which gave employment to 85 per cent of the wage earners reported for the combined industry in that year, the month of greatest employment was June, and the minimum number of wage earners, reported for September, was equal to 64.9 per cent of the maximum.

Prevailing hours of labor.—In the next table the wage earners have been classified according to the hours of labor prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though some employees worked a greater or less number of hours.

Table 9 AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY AS A WHOLE: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States..	75,721	330	2,253	22,734	26,669	22,280	46	1,407
Connecticut.....	3,815	.....	72	1,395	884	1,461	.....	.....
Illinois.....	2,382	46	250	994	363	1,713	16	.....
Indiana.....	2,797	18	19	1,505	3,488	1,767	.....	.....
Massachusetts.....	6,138	3	232	2,645	1,242	16	.....	.....
Michigan.....	25,444	2	17	4,775	7,086	13,564	.....	.....
New Jersey.....	1,024	.....	51	680	144	140	.....	.....
New York.....	8,861	86	1,525	4,068	2,248	1,932	.....	2
Ohio.....	12,130	2	64	4,469	6,055	1,051	.....	489
Pennsylvania.....	3,199	1	.....	746	2,257	195	.....	.....
Wisconsin.....	4,298	4	.....	273	2,121	985	.....	915

More than nine-tenths (94.7 per cent) of the wage earners employed in the industry in 1909 worked in establishments reporting from 54 to 60 hours per week, inclusive, as the prevailing hours of labor. Establishments reporting more than 54 but less than 60 hours as the period of employment per week employed 35.2 per cent of the wage earners, establishments reporting 54 hours 30 per cent, and establishments reporting 60 hours 29.4 per cent. Only 1.9 per cent were employed in establishments where the usual hours of labor per week were more than 60, and only 3.4 per cent in establishments where they were less than 54. Practically all the wage earners employed in establishments where the prevailing hours of labor were more than 60 per week were reported from Wisconsin and Ohio, and more than three-fifths (62.4 per cent) of those employed in establishments where the hours of labor were less than 54 per week were reported from New York.

Character of ownership.—The next table shows data as to character of ownership for establishments engaged in the industry in the United States in 1909 and 1904.

Table 10 AUTOMOBILES, INCLUDING BODIES AND PARTS.

CHARACTER OF OWNERSHIP.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	743	178	\$248,202,075	\$30,033,536
Individual.....	162	35	4,184,686	2,003,043
Firm.....	103	30	9,214,425	1,575,642
Corporation.....	478	113	235,802,964	26,454,851
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	21.8	19.7	1.7	6.7
Firm.....	13.9	16.9	3.7	5.2
Corporation.....	64.3	63.4	94.6	88.1

In both 1909 and 1904 more than five-eighths of the total number of establishments were under corporate ownership, the percentage being slightly higher in 1909 than in 1904. This group of establishments, however, contributed a much larger proportion of the total value of products in 1909 than in 1904, 94.6 per cent as compared with 88.1 per cent. The proportion of establishments under individual ownership increased slightly during the five-year period, but the value of products reported for this group formed a smaller percentage of the total in 1909 than in 1904. As shown by Table 10, establishments owned by firms represented a smaller proportion of the total number of establishments and contributed a smaller proportion of the total value of products in the later than in the earlier year.

Table 11 gives statistics in respect to the character of ownership, or legal organization, of the establishments engaged in the industry in the states where an average of more than 500 wage earners were employed in 1909.

In all the states for which separate figures are included in the table, establishments under corporate ownership constituted more than half of the total number and reported the majority of the wage earners and the greater part of the value of products and value added by manufacture. The establishments owned by individuals attained their greatest relative importance in Massachusetts, where they did a business about one-tenth as great as that done by corporations. The establishments owned by firms were of greatest importance in Wisconsin, where they did about half as much business as was done by corporations. In all the other states shown in the table the business done by either individuals or firms was relatively unimportant, although in New York products to the value of over \$1,000,000 were reported from establishments owned by individuals, and in Ohio and also in Michigan products to the value of over \$1,500,000 were reported by firms. These amounts are, however, small as compared with the production reported by corporations in those states.

Table 11

AUTOMOBILES, INCLUDING BODIES AND PARTS: 1909

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	162	103	478	1,641	2,512	71,568	\$4,184,686	\$9,214,425	\$235,802,964	\$2,282,376	\$5,126,602	\$110,147,361
Connecticut.....	3	2	23	55	(X)	3,760	107,691	(X)	11,560,537	67,763	(X)	6,744,161
Illinois.....	16	8	41	86	62	2,234	220,925	181,152	6,751,741	128,350	98,809	2,947,540
Indiana.....	9	10	48	74	410	6,313	106,876	610,698	23,146,496	75,507	288,594	8,405,100
Massachusetts.....	20	8	34	370	126	3,642	1,044,768	346,727	9,967,729	563,066	176,869	5,127,811
Michigan.....	10	9	94	71	515	24,858	172,570	1,701,035	94,777,846	92,321	887,940	41,788,769
New Jersey.....	4	2	18	25	(X)	999	53,752	(X)	1,953,764	50,563	(X)	1,084,771
New York.....	23	17	73	413	258	9,190	1,003,804	686,829	29,288,894	604,838	382,963	15,083,624
Ohio.....	10	13	52	147	228	11,755	227,816	1,608,896	37,002,042	137,171	788,593	19,390,992
Pennsylvania.....	15	6	23	143	42	3,014	374,220	78,846	6,078,667	169,466	53,901	2,257,513
Wisconsin.....	6	5	19	29	701	3,568	91,846	3,552,677	7,795,719	38,734	2,125,081	3,936,213

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics.

Size of establishment.—Table 12 groups the establishments engaged in the manufacture of automobiles, including bodies and parts, according to the value of their products and shows for each group, for 1909 and 1904, the number of establishments and value of products, together with the percentage of the respective totals contributed by each group.

Table 12

AUTOMOBILES, INCLUDING BODIES AND PARTS.

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	743	178	\$249,202,075	\$30,033,638
Less than \$5,000.....	89	32	240,866	92,862
\$5,000 and less than \$20,000.....	170	44	1,937,965	477,744
\$20,000 and less than \$100,000.....	228	54	10,760,970	2,705,085
\$100,000 and less than \$1,000,000.....	200	38	65,875,412	12,762,176
\$1,000,000 and over.....	66	10	170,386,862	13,995,669
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	12.0	18.0	0.1	0.3
\$5,000 and less than \$20,000.....	22.9	24.7	0.8	1.6
\$20,000 and less than \$100,000.....	30.7	30.3	4.3	9.0
\$100,000 and less than \$1,000,000.....	26.9	21.3	26.4	42.5
\$1,000,000 and over.....	7.5	5.6	63.4	46.6

Of the 743 establishments reported as engaged in the industry in 1909, 56, or 7.5 per cent, had products valued at more than \$1,000,000 each. The corresponding figures for 1904 were 10 out of 178 establishments, or 5.6 per cent. Although these establishments were relatively unimportant numerically, they reported a large proportion of the total value of products, the percentage for 1909 (63.4) being much larger than that for 1904 (46.6). On the other hand, the establishments in each of the four remaining groups contributed a smaller proportion of the value of products in 1909 than in 1904. Only a small percentage of the value of products was reported by the establishments having products of less than \$100,000 in value—5.2 per cent in 1909 and 10.9 per cent in 1904—notwithstanding the fact that such establish-

ments formed 65.6 per cent of the total number in 1909 and 73 per cent in 1904.

As computed from the figures in Table 2, the average number of wage earners per establishment in the industry as a whole increased from 68 in 1904 to 102 in 1909, the average value of products from \$168,728 to \$335,400, and the average value added by manufacture from \$94,844 to \$158,218. In 1909 the average value of products per establishment for establishments engaged chiefly in manufacturing automobiles was \$731,408, and for those manufacturing chiefly automobile bodies and parts, \$115,856.

In some respects, and especially from the standpoint of conditions under which persons engaged in the industry work, the best classification of establishments to bring out the feature of size is a classification according to the number of wage earners employed. Table 13 gives such a classification, showing the number of establishments in each group and the average number of wage earners employed in each of the 10 states where an average of more than 500 wage earners were employed in 1909.

There were 220 establishments employing from 1 to 5 wage earners each, 173 employing from 6 to 20, and 122 employing from 21 to 50, these three classes of establishments comprising, respectively, 29.6 per cent, 23.3 per cent, and 16.4 per cent of the total number of establishments. Although the establishments in these three groups thus constituted 69.3 per cent of the total number, however, they reported only 9.1 per cent of the wage earners. The great majority of the wage earners, 83.9 per cent, were in establishments having more than 100 wage earners each. The single group having the largest number of wage earners was that consisting of establishments with over 1,000 wage earners each, these establishments employing in the aggregate 24,707 wage earners, or 32.6 per cent of the total number.

Table 13

AUTOMOBILES, INCLUDING BODIES AND PARTS.

STATE.	Establishments employing in 1909—																				
	Total.		No wage earners.			1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (aver-age num-ber).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States.	743	75,721	12	220	597	173	2,119	122	4,146	73	5,337	77	12,477	31	11,291	20	15,047	15	24,707		
Connecticut.....	28	3,815	1	4	9	4	38	6	188	5	354	6	1,009	.....	.....	1	957	1	1,260
Illinois.....	65	2,332	.....	28	65	13	156	12	402	6	466	4	737	2	556	.....	.....	.....	.....
Indiana.....	67	6,797	.....	22	57	13	173	11	401	4	300	10	1,846	4	1,424	2	1,219	1	1,377	
Massachusetts.....	62	4,138	2	13	40	17	214	17	588	5	390	4	567	2	744	2	1,595	.....	.....
Michigan.....	113	25,444	.....	19	61	21	241	19	604	14	1,044	23	3,637	5	2,025	7	5,212	5	12,620	
New Jersey.....	24	1,024	.....	8	29	6	90	3	91	4	270	2	264	1	280	.....	.....	.....	.....
New York.....	113	9,861	2	27	75	29	380	24	773	13	934	10	1,672	3	984	2	1,520	3	3,523		
Ohio.....	75	12,130	1	14	36	17	204	9	386	9	586	10	1,421	9	3,245	2	1,351	4	4,898		
Pennsylvania.....	44	3,199	3	9	24	13	134	8	271	2	163	5	771	3	1,192	1	644	.....	.....
Wisconsin.....	30	4,298	.....	12	30	9	114	2	92	1	84	2	400	.....	.....	3	2,549	1	1,028

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation and consequently can not be used for determining profits. Facts of interest, however, can be brought out concerning the relative importance of those classes of expenses which were reported. As shown by Table 2, the total reported expenses in 1909 amounted to \$210,690,666, of which \$131,645,736, or 62.5 per cent, represented materials; \$48,693,867, or 23.1 per cent, wages; \$9,479,424, or 4.5 per cent, salaries; and \$20,871,639, or 9.9 per cent, miscellaneous expenses. Since the cost of materials, as previously explained, involves a certain amount of duplication, the figures and percentages here presented exaggerate somewhat the relative importance of this item. The item of miscellaneous expenses includes \$882,511 paid as rent of factories, \$600,921 as taxes, \$550,329 for contract work, and \$18,837,878 for other miscellaneous expenses, including traveling expenses, insurance, and other sundry items. Although there is necessarily some variation among the several states in the proportions of the total expenses formed by the respective items, the differences are not great, and are due largely to differences in the processes carried on in the various establishments. As a result of the extensive development of that branch of the industry chiefly engaged in the manufacture of automobile bodies and parts, many establishments which turn out complete automobiles merely assemble parts made elsewhere, and in establishments of this character a greater proportion of the total expense is incurred for materials and a smaller proportion for wages than in establishments which make to a considerable extent the parts which they use in the construction of complete automobiles. In the United States as a whole, the cost of materials represented 65.8 per cent of the total expenses in the case of establishments whose chief products were complete automobiles, and 50.8 per cent in the case of those whose chief products were automobile bodies and parts.

Engines and power.—Table 14 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by purchased current), and their total horsepower at the censuses of 1909, 1904, and 1899. It also shows separately the number and horsepower of electric motors, including those operated by current generated in the establishment reporting.

Table 14

AUTOMOBILES, INCLUDING BODIES AND PARTS.

POWER.	AUTOMOBILES, INCLUDING BODIES AND PARTS.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	2,548	153	61	75,550	10,109	3,164	100.0	100.0	100.0
Owned.....	473	153	48	46,612	8,915	2,815	61.7	88.2	89.0
Steam.....	273	74	33	39,325	7,376	2,610	52.0	73.0	82.5
Gas.....	192	77	13	7,900	1,459	130	9.3	14.4	4.1
Water wheels....	8	2	2	287	80	75	0.4	0.8	2.4
Rented.....	2,075	(¹)	13	28,938	1,194	349	38.3	11.8	11.0
Electric.....	2,075	(¹)	13	27,641	1,051	164	36.6	10.4	5.2
Other.....	.....	.....	.....	1,297	143	185	1.7	1.4	5.8
Electric motors.	2,832	108	45	41,829	4,228	601	100.0	100.0	100.0
Run by current generated by establishment.....	857	108	32	14,188	3,178	437	33.9	75.1	72.7
Run by rented power.....	2,075	(¹)	13	27,641	1,051	164	66.1	24.9	27.3

¹ Not reported.

The total horsepower used in the industry in 1909 was more than seven times as great as the amount used in 1904. At both censuses the greater part of the power was furnished by steam engines, but such power formed a much smaller proportion of the total primary power in 1909 than in 1904, the percentages being 52 and 73, respectively. On the other hand, rented electric power formed 36.6 per cent of the total primary power used in the industry in 1909, as compared with only 10.4 per cent in 1904.

The proportion of the total primary power developed by the use of gas and other internal combustion en-

gines in 1909 was below that for 1904. But little water power was used in the industry and the proportion which such power formed of the total was less in 1909 than in 1904.

Table 15 shows for 1909, for the 10 leading states, the amount of each of the several kinds of power used and also the quantity of the different kinds of fuel consumed.

Table 15 AUTOMOBILES, INCLUDING BODIES AND PARTS.

STATE.	Primary horsepower.		Owned by establishments reporting.						Rented.		Electric horsepower.		Fuel used.				
	Number of establishments reporting.	Total horsepower.	Total.	Steam engines.	Gas engines.	Water wheels.	Other.	Elec-tric.	Other.	Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
												Anthra-cite (long tons).	Bitumi-nous (short tons).				
United States.....	664	75,550	46,612	39,325	7,000	287	.....	27,841	1,287	41,829	14,188	17,346	319,497	14,282	2,183	86,873	385,466
Connecticut.....	26	3,937	2,271	2,173	98	.....	.....	1,666	.....	2,453	787	820	16,115	44	4	15,749	21,732
Illinois.....	61	1,786	661	480	161	20	.....	1,052	73	1,160	108	7	11,839	161	.....	153	3,196
Indiana.....	62	5,813	3,904	3,460	444	.....	.....	1,909	.....	2,866	957	44	34,783	1,182	20	7,085	19,276
Massachusetts.....	56	2,896	1,831	1,465	196	170	.....	607	458	697	90	2,561	7,411	75	12	154	7,302
Michigan.....	111	25,938	12,945	11,388	1,557	.....	.....	12,526	467	16,346	3,820	1,451	98,900	5,178	1,810	34,939	90,610
New Jersey.....	20	1,311	1,144	1,066	78	.....	.....	167	.....	692	525	1,372	3,105	20	.....	126	1,718
New York.....	96	9,398	6,474	5,304	1,075	95	.....	2,894	30	4,116	1,222	5,046	33,557	5,207	2	4,590	70,739
Ohio.....	65	14,433	9,983	7,881	2,102	.....	.....	4,445	5	8,094	3,649	1,057	61,588	1,591	212	16,653	151,524
Pennsylvania.....	38	2,746	2,376	2,185	191	.....	.....	364	6	1,894	1,894	3,590	22,405	410	.....	4,658	7,039
Wisconsin.....	29	3,153	2,964	2,265	699	.....	.....	189	.....	1,043	854	1,039	21,606	199	11	1,344	6,929
All other states.....	100	4,139	2,059	1,658	399	2	.....	1,822	258	2,104	282	359	8,188	215	112	1,422	5,403

More than one-third (34.3 per cent) of the total horsepower shown for the industry in 1909 was used by establishments in Michigan, and these, together with the factories of Ohio and New York, reported 65.9 per cent of the total. These three states used 62.5 per cent of the total steam power, 67.6 per cent of the power generated by gas and other internal combustion engines, and 71.9 per cent of the rented electric power. Michigan led in the amount of steam power and of rented electric power employed, but was second in respect to power generated by gas and other internal combustion engines, Ohio being first.

Fuel consumed.—The amount expended for fuel and rent of power in 1909, \$1,661,724, is distributed, by states, in Table 23, and the quantity of fuel used is shown for the leading states in Table 15.

Bituminous coal was the principal kind of fuel in this industry, 319,497 tons having been consumed in 1909; of anthracite coal, only 17,346 tons were used; of oil, including gasoline, 86,873 barrels; of gas, 385,468,000 feet; and of coke, 14,282 tons. Michigan led all other states in the consumption of bituminous coal and oil, but Ohio was first in the amount of gas consumed.

SPECIAL STATISTICS RELATING TO PRODUCTS.

Automobiles made, classified according to kind of propelling power.—Table 16 shows the total number and value of the automobiles reported for the industry in 1909 and 1904, classified according to motive power, with the proportion which each class represented of the total and the percentages of increase between the two censuses.

Of the automobiles turned out by establishments engaged in the industry in 1909, 95.1 per cent were gasoline vehicles, the proportion being considerably larger than that in 1904 (86.2 per cent). The number of gasoline automobiles made in 1909 was more than six times as great as the number made in 1904. Steam and electric vehicles gained in number at a much less rapid rate, showing increases of 51.4 and 168.5 per cent, respectively, and each of these classes formed a smaller proportion of the total number in 1909 than at the preceding census. In 1904 more steam than electric automobiles were reported, but in 1909 the reverse was true. It will be observed that for each of the three kinds of automobiles shown in the table a greater relative increase is shown in the value than in the number. This does not necessarily indicate an increase of prices; it may mean simply an increase in the proportion of more expensive machines.

Table 16

	1909	Per cent distribution: 1909	1904	Per cent distribution: 1904	Per cent of increase: 1904-1909
Number of establishments.....	265	.....	121	.....	119.0
Automobiles: ¹					
Number.....	126,593	100.0	21,692	100.0	483.6
Value.....	\$164,269,324	100.0	\$23,751,234	100.0	591.6
Gasoline—					
Number.....	120,393	95.1	18,699	86.2	543.8
Value.....	\$153,529,653	93.5	\$19,566,941	82.4	684.6
Electric—					
Number.....	3,826	3.0	1,425	6.6	168.5
Value.....	\$7,259,430	4.4	\$2,496,255	10.5	190.8
Steam—					
Number.....	2,374	1.9	1,568	7.2	51.4
Value.....	\$3,480,241	2.1	\$1,688,038	7.1	106.2

¹ Statistics for 1909 include 23 automobiles, valued at \$65,800, of which 1 was gasoline and 22 were electric, made in establishments whose principal products were automobile bodies and parts, but do not include 694 automobiles, valued at \$830,080, reported by establishments in other industries, chiefly the carriage and wagon industry.

Table 17 shows, by states, the number and value of automobiles using the several kinds of motive power made in establishments engaged in the industry in 1909 and 1904.

KIND OF POWER AND STATE.	NUMBER.		VALUE.	
	1909	1904	1909	1904
All kinds (gasoline, electric, and steam)	126,593	21,692	\$184,269,324	\$23,751,234
California.....	578	12	815,157	13,606
Connecticut.....	2,915	832	7,364,852	1,958,682
Illinois.....	3,442	205	4,475,642	262,691
Indiana.....	17,253	1,020	17,604,936	1,428,463
Iowa.....	399	.....	425,550	.....
Maryland.....	246	.....	386,623	.....
Massachusetts.....	3,466	2,365	6,229,438	2,052,943
Michigan.....	64,800	9,125	70,359,749	6,552,804
Minnesota.....	138	.....	217,250	.....
Missouri.....	701	.....	1,011,346	.....
New Jersey.....	96	51	187,339	71,400
New York.....	8,064	1,808	17,509,582	3,071,093
Ohio.....	14,299	2,808	23,550,112	5,197,360
Pennsylvania.....	1,999	963	4,148,661	1,134,776
Wisconsin.....	5,591	2,390	7,085,562	1,856,694
Gasoline	120,393	18,699	153,529,653	19,568,941
California.....	578	12	815,157	13,606
Indiana.....	16,707	595	16,734,648	1,034,519
Maryland.....	246	.....	386,623	.....
Massachusetts.....	2,739	1,765	5,436,311	1,662,943
Michigan.....	64,262	9,114	69,130,223	6,537,404
Minnesota.....	138	.....	217,250	.....
Missouri.....	701	.....	1,011,346	.....
New York.....	7,529	1,496	16,446,788	2,169,093
Ohio.....	10,947	1,811	17,999,332	3,853,621
Wisconsin.....	5,591	2,388	7,085,562	1,853,094
Electric	3,826	1,425	7,259,430	2,496,255
Indiana.....	546	424	870,288	391,444
Michigan.....	538	11	1,229,526	15,400
Ohio.....	1,641	200	2,732,580	196,000
Steam	2,374	1,568	3,480,241	1,688,038
Ohio.....	1,711	797	2,818,200	1,147,739

The manufacture of automobiles in establishments whose products of chief value were either the completed vehicles or bodies and parts was carried on in 1909 in 24 states. The bulk of the output, however, was confined to a few states. The establishments in Michigan, Ohio, Indiana, and New York together reported 104,416 automobiles, valued at \$129,024,379, or 82.5 per cent of the total number and 78.5 per cent of the total value shown for the automobile industry in 1909, as compared with 14,761, or 68 per cent, and \$16,249,720, or 68.4 per cent, respectively, in 1904.

Michigan was the leading state at each census in respect to both the total number and total value of motor vehicles manufactured. The automobiles made in Michigan, where the industry is largely centralized, represented 51.2 per cent of the total number and 42.8 per cent of the total value in 1909, and 42.1 per cent and 27.6 per cent, respectively, in 1904.

Indiana and Ohio ranked second and third, respectively, in 1909 in the total number of automobiles produced, but in the value of the output Ohio was second and Indiana third. While less than half as many automobiles were made in New York as in Indiana, the value of all machines produced in the former state was practically equal to that reported for the latter.

More than half (64,262, or 53.4 per cent) of the total number of gasoline automobiles and nearly half (\$69,130,223, or 45 per cent) of their total value were reported by Michigan in 1909. Ohio was the leading state in the production of electric and steam automobiles, reporting 37.6 per cent and 81 per cent, respectively, of the total value of these machines in 1909.

Automobiles made, classified according to use and type.—Table 18 shows for the leading states the number and value of the several types of automobiles made in the establishments engaged in the industry in 1909 and 1904.

CLASS AND STATE.	NUMBER.		VALUE.	
	1909	1904	1909	1904
All classes	126,593	21,692	\$164,269,324	\$23,751,234
Pleasure and family vehicles	121,868	20,281	155,821,331	21,651,431
Touring cars	76,114	7,220	113,403,188	11,781,521
Connecticut.....	2,165	292	5,613,262	1,008,383
Illinois.....	2,059	52	2,746,214	75,838
Indiana.....	6,838	387	10,710,289	736,869
Massachusetts.....	2,063	361	4,673,171	692,439
Michigan.....	43,855	2,561	51,365,984	2,402,125
New York.....	5,440	397	12,296,292	995,982
Ohio.....	6,479	2,521	14,307,360	4,967,731
Runabouts	36,204	12,131	28,030,479	8,831,504
Connecticut.....	393	209	815,888	283,800
Illinois.....	433	54	292,908	35,800
Indiana.....	8,139	230	5,055,208	173,084
Massachusetts.....	983	1,153	654,838	816,844
Michigan.....	18,173	6,432	13,399,937	4,057,439
New York.....	1,097	1,082	1,539,554	1,163,554
Ohio.....	2,900	186	2,948,588	124,629
All other varieties	9,550	910	14,387,664	1,038,306
Illinois.....	470	47	969,580	70,297
Indiana.....	2,104	372	1,445,357	476,050
Michigan.....	1,855	30	3,990,988	21,600
New York.....	507	60	1,480,735	79,600
Ohio.....	4,114	100	5,374,914	100,000
Pennsylvania.....	67	51	80,805	73,300
Business vehicles	4,725	1,431	8,447,993	2,099,903
Delivery wagons	1,862	251	1,918,856	455,457
Illinois.....	447	.....	406,410	.....
Indiana.....	107	18	157,358	20,160
Michigan.....	401	51	519,071	35,250
New York.....	139	77	232,989	191,457
Ohio.....	469	.....	242,105	.....
Pennsylvania.....	242	.....	406,325	.....
Trucks	1,366	160	3,165,512	491,490
Illinois.....	28	.....	46,955	.....
Indiana.....	43	.....	109,492	.....
Michigan.....	372	51	994,311	56,390
New York.....	475	81	889,724	349,500
Ohio.....	202	1	386,945	5,000
All other varieties	1,497	1,020	3,363,625	1,152,958
Connecticut.....	119	164	259,028	468,400
Indiana.....	22	13	127,232	22,300
Massachusetts.....	280	673	509,646	269,200
Michigan.....	144	.....	289,458	.....
New York.....	406	111	1,020,183	201,000
Ohio.....	135	.....	290,200	.....
Pennsylvania.....	127	5	323,026	13,300

Of the various classes of automobiles distinguished in this table, the most important in point of numbers and of value is that of touring cars, the total number of this class manufactured in 1909 being 76,114, with a value of \$113,403,188, as compared with 7,220, valued at \$11,781,521, in 1904. Such cars represented 60.1 per cent of the total number and 69 per cent of the total value of automobiles made in 1909. The class next in importance is that of runabouts, of which 36,204 were produced, with a value of \$28,030,479, in 1909, and 12,131, valued at \$8,831,504, in 1904. In 1909, of all other varieties of pleasure and family vehicles, which includes buggies, limousines, cabs, surreys, victorias, etc., 9,550, valued at \$14,387,664, were produced.

In the production of touring cars and of runabouts, Michigan was the leading state in 1909, reporting 45.3 per cent and 47.8 per cent, respectively, of the total

value of such machines. In 1904 Michigan reported 20.4 per cent of the total value of touring cars, being exceeded in the value of this class of machines by Ohio, which reported 42.2 per cent of the total. In the value of runabouts, however, Michigan led in 1904 with 45.9 per cent. Indiana ranked next to Michigan in the production of runabouts in 1909, while Ohio was the second state in the value of touring cars produced. In the production of "all other varieties" of pleasure and family vehicles, Ohio was the leading state in 1909, reporting 37.4 per cent of their total value in that year. In 1904 Indiana led, reporting 45.8 per cent of the total value of these cars produced.

In the number of delivery wagons manufactured in 1909 Michigan was outranked by Ohio and Illinois, and in their value by Illinois and Pennsylvania. In 1904 New York was the leading state in the value of this class of vehicles.

New York reported the largest number of motor trucks in 1909, but the aggregate value was less than

that reported by Michigan. In 1904, however, New York led both in the number and in the value of such vehicles, reporting 71.1 per cent of the value.

New York led in the value of "all other varieties" of business vehicles in 1909, reporting 30.3 per cent of the total value. In 1904 Connecticut was the leading state in this respect, reporting 40.6 per cent of the total value.

All the states for which comparative figures are given show large relative increases in the total number and value of automobiles manufactured, except that Massachusetts reported a smaller number and value for runabouts in 1909 than in 1904, while for "all other varieties" of business vehicles Connecticut reported a smaller number and value, and Massachusetts a smaller number, in 1909 than in 1904.

Automobiles made, classified according to motive power and type.—Table 19 shows the number and value of the several kinds of automobiles, classified also according to motive power, as reported for 1909 and 1904, with percentages of increase.

CLASS.	TOTAL.		GASOLINE.		ELECTRIC.		STEAM.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Total: ¹								
1909.....	128,593	\$184,269,324	120,393	\$153,628,863	3,928	\$7,259,430	2,374	\$3,490,241
1904.....	21,692	\$23,751,234	18,889	\$19,566,941	1,425	\$2,498,256	1,568	\$1,688,038
Per cent of increase.....	483.6	591.6	543.8	684.6	168.5	190.8	51.4	106.2
Touring cars:								
1909.....	76,114	\$113,403,188	73,883	\$109,844,295	243	\$387,526	1,988	\$3,171,367
1904.....	7,220	\$11,781,521	6,444	\$10,576,023	39	\$55,038	737	\$1,150,460
Per cent of increase.....	954.2	862.6	1,046.5	938.6	(²)	(²)	169.7	175.7
Runabouts:								
1909.....	36,204	\$28,030,479	35,347	\$27,116,901	496	\$648,630	361	\$264,948
1904.....	12,131	\$8,831,504	10,999	\$7,976,821	455	\$453,304	677	\$401,379
Per cent of increase ³	198.4	217.4	221.4	239.9	9.0	43.1	-46.7	-34.0
Delivery wagons:								
1909.....	1,862	\$1,918,856	1,645	\$1,474,063	217	\$444,793		
1904.....	251	\$455,457	140	\$215,897	109	\$235,560	2	\$4,000
Per cent of increase.....	641.8	321.3	1,075.0	682.8	99.1	88.8		
Trucks:								
1909.....	1,368	\$3,165,512	1,090	\$2,384,703	278	\$780,809		
1904.....	160	\$491,490	55	\$50,390	105	\$441,100		
Per cent of increase.....	753.8	544.1	(²)	(²)	162.9	77.0		
All other varieties:								
1909.....	11,047	\$17,751,289	8,428	\$12,709,691	2,594	\$4,997,672	25	\$43,926
1904.....	1,930	\$2,191,262	1,061	\$747,810	717	\$1,311,253	152	\$132,199
Per cent of increase ³	472.4	710.1	694.3	1,599.6	261.8	261.1	-83.6	-86.8

¹ In addition, 694 automobiles were reported in 1909 and 1,138 in 1904 by establishments engaged primarily in other industries.
² Per cent not shown where base is less than 100 for number or less than \$100,000 for value.
³ A minus sign (-) denotes decrease.

The largest percentage of increase in the total number and value for the five-year period 1904-1909 is shown for gasoline touring cars, of which more than eleven times as many were made in 1909 as in 1904. About three-fifths of the gasoline machines made in 1909 were touring cars. Of electric vehicles, touring cars made a greater relative gain in number and value than any of the other three types for which separate figures are shown, although runabouts were the most numerous class and trucks had the greatest value. The use of steam as a motive power for automobiles is confined almost entirely to touring cars, and there was a considerable increase in the manufacture of steam cars of this class. The figures here presented indicate that the application of steam to other types of automobiles is not only very limited but is decreasing.

Automobiles made, classified according to horsepower rating.—Table 20 shows the numbers of the various kinds of machines made in 1909, classified according to horsepower rating.

More than nine-tenths of the automobiles made in establishments engaged in the industry in 1909 had motors of from 10 to 49 horsepower, 40.5 per cent of the total number being rated at from 30 to 49 horsepower, 27.9 per cent at from 20 to 29 horsepower, and 23.2 per cent at from 10 to 19 horsepower. Only 6 per cent of the total number were rated at less than 10 horsepower, and only 2.5 per cent at more than 50 horsepower.

Of the passenger automobiles turned out by the factories of the industry in 1909, 61.7 per cent were touring cars and 29.4 per cent runabouts. The

majority of the runabouts were low-powered machines, 78.7 per cent being rated at from 10 to 29 horsepower. Nearly all the high-powered automobiles were touring cars. More than nine-tenths of the touring cars were vehicles of over 20 horsepower, 60.3 per cent of the total number being rated at from 30 to 49 horsepower and 28.6 per cent at from 20 to 29 horsepower.

Table 20

CLASS.	NUMBER OF AUTOMOBILES MANUFACTURED: 1909						
	Total number.	Classified according to horsepower rating.					
		Less than 10.	10 to 19.	20 to 29.	30 to 49.	50 to 89.	90 or more.
Total number.....	126,593	7,539	29,353	35,257	51,218	3,197	29
Passenger vehicles (pleasure, family, and public conveyances).....	123,338	7,220	28,154	34,346	50,510	3,079	29
Buggies.....	4,582	482	3,705	339	56	.....	7
Runabouts.....	36,204	4,532	17,548	10,931	3,029	157	.....
Touring cars.....	76,114	177	5,415	21,773	45,926	2,802	21
Closed (cabs, limousines, etc.).....	5,205	1,589	1,474	1,250	829	62	1
All other (omnibuses, sight-seeing wagons, ambulances, patrol wagons, etc.).....	1,233	440	12	53	670	58	.....
Business vehicles (merchandise).....	3,255	319	1,199	911	708	118	.....
Delivery wagons.....	1,862	263	878	624	97	.....	.....
Trucks.....	1,366	56	317	286	606	101	.....
All other.....	27	.....	4	1	5	17	.....

Imports and exports.—Table 21, compiled from the reports of the Bureau of Foreign and Domestic Commerce, Department of Commerce, shows the number

and value of the automobiles imported and of those exported for the fiscal years 1906 to 1910, inclusive.

Table 21 YEAR. ¹	IMPORTS.		EXPORTS.		EXCESS OF EXPORTS OVER IMPORTS.	
	Number.	Value.	Number.	Value.	Number.	Value.
1906.....	1,106	\$3,844,505	(²)	\$3,497,016	(²)	³ \$347,489
1907.....	1,176	4,041,025	2,862	4,890,886	1,686	849,861
1908.....	1,045	2,500,134	2,477	4,656,991	1,432	2,156,857
1909.....	1,624	2,905,391	3,184	5,387,021	1,560	2,481,630
1910.....	1,473	2,851,446	6,926	9,548,700	5,453	6,697,254

¹ Fiscal year ending June 30.

² Figures not available.

³ Excess of imports over exports.

Data as to imports and exports are not available for years prior to 1906, in which year the value of the imports of automobiles was 9.9 per cent greater than that of the exports. In each year from 1907 to 1910 the value of exports exceeded that of imports, until in 1910 the excess in value amounted to \$6,697,254, or 234.9 per cent.

In the four fiscal years, 1907 to 1910, for which figures as to number and value of automobile exports and imports are available, 5,318 motor vehicles, valued at \$12,297,996, were imported, and 15,449, valued at \$24,483,598, were exported, the excess of the exports being 10,131 in number and \$12,185,602 in value. During this four-year period 452 foreign-made automobiles, or 8.5 per cent of the number imported, were exported.

DETAILED STATE TABLES.

The principal statistics secured from the census inquiry concerning the industry are presented, by states, in Tables 22 and 23.

Table 22 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, amounts paid for the various items of expense reported, value of products, and value added by manufacture.

Table 23 gives similar but more detailed statistics for 1909 only.

AUTOMOBILES, INCLUDING BODIES AND PARTS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.					Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).	Expressed in thousands.							
United States.....	1909 1904 1899	743 178 57	85,359 13,333	405 103	9,233 1,181 288	75,721 12,049 2,241	75,550 10,109	\$173,837 23,084 5,789	\$9,479 1,257 285	\$48,694 7,159 1,321	\$131,648 13,151 1,804	\$249,202 30,034 4,748	\$117,556 16,883 2,944	
California.....	1909 1904 1899	41 6	589 21	50 4	61 3	478 14	305 32	701 49	71 5	368 10	700 13	1,470 36	770 23	
Connecticut.....	1909 1904 1899	28 17	4,444 1,131	8 4	621 62	3,816 1,065	3,937 1,283	12,131 3,713	634 86	2,878 784	4,856 1,163	11,668 2,644	6,812 1,481	
Illinois.....	1909 1904 1899	65 12 4	2,804 192	41 8	381 17 36	2,382 187 303	1,786 136	4,084 401 975	426 28 28	1,653 107 218	3,979 112 202	7,154 357 748	3,175 245 456	
Indiana.....	1909 1904 1899	67 11	7,763 921	36 8	920 99	6,797 816	5,813 760	16,722 1,164	870 80	4,131 496	14,995 824	23,764 1,639	8,769 815	
Massachusetts.....	1909 1904 1899	62 18 12	4,624 1,229	38 16	448 114 18	4,138 1,100 303	2,896 909	7,458 1,939 476	497 128 24	2,793 709 188	5,491 1,268 307	11,359 2,683 789	5,868 1,395 462	
Michigan.....	1909 1904 1899	113 35	28,098 2,953	29 17	2,625 201	25,444 2,735	25,938 1,800	52,926 4,347	2,570 236	16,491 1,268	53,882 3,443	96,651 7,997	42,769 4,554	
Missouri.....	1909 1904 1899	17 13	449 37	6 3	75 13	368 21	184 20	800 24	85 5	252 16	1,025 31	1,677 83	652 32	
New Jersey.....	1909 1904 1899	24 15 4	1,159 83	8 1	127 22 35	1,024 60 201	1,311 367	2,703 310 763	160 14 54	615 40 144	892 44 176	2,008 119 479	1,116 75 303	
New York.....	1909 1904 1899	113 35 15	11,610 2,101	59 21	1,690 231 56	9,861 1,849 288	9,398 1,254	25,102 3,347 639	1,604 231 57	7,016 1,227 166	14,908 1,907 173	30,980 4,260 456	16,072 2,353 283	
Ohio.....	1909 1904 1899	75 22 3	13,458 2,939	42 8	1,286 209 7	12,130 2,722 86	14,433 1,877	30,892 4,226 68	1,430 254 5	7,746 1,617 52	18,522 2,653 60	38,839 6,358 145	20,317 3,805 85	
Pennsylvania.....	1909 1904 1899	44 6 8	3,586 631	29	338 65 16	3,199 666 60	2,746 423	6,971 1,453 297	384 79 18	1,808 352 43	4,051 601 31	6,532 1,226 99	2,481 625 68	
Wisconsin.....	1909 1904 1899	30 16	4,647 587	18 8	331 69	4,298 520	3,153 645	8,746 1,240	443 64	2,733 300	5,340 845	11,440 1,875	6,100 1,030	
All other states.....	1909 1904 1899	64 14 11	2,168 508	41 8	330 86 100	1,787 414 1,000	3,650 603	4,601 841 2,551	305 57 109	1,210 233 510	3,005 347 765	5,660 797 2,052	2,655 450 1,287	

1 Excluding statistics for one establishment, to avoid disclosure of individual operations.
 2 Figures can not be shown without disclosing individual operations.
 3 Excluding statistics for two establishments, to avoid disclosure of individual operations.

AUTOMOBILES, INCLUDING BODIES AND PARTS—

Table 23		PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.				Primary horse-power.		
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.				Total.	16 and over.		Under 16.				
					Male.	Female.	Average number.	Number, 15th day of—		Male.		Female.	Male.	Female.				
								Maximum month.	Minimum month.									
1	United States	743	85,358	405	2,159	5,422	1,652	75,721	De	89,888	Ja	62,724	97,250	98,060	982	204	4	75,550
2	California	41	589	50	27	21	13	478	Jy	534	Ja	418	471	451	17	3		306
3	Colorado	4	94	2	1	7	2	82	Jy ¹	92	De	67	67	67				142
4	Connecticut	28	4,444	8	146	362	113	3,815	De	4,589	Ja	3,320	4,996	4,936	32	28		3,937
5	Illinois	65	2,804	41	122	195	64	2,382	My	2,524	No	2,107	2,598	2,562	36			1,786
6	Indiana	67	7,753	36	182	552	186	6,797	De	8,825	Ja	5,488	8,949	8,873	40	36		5,813
7	Iowa	11	282	6	10	13	5	248	Au	311	Fe	194	260	258	2			1,249
8	Maryland	5	241	3	19	12	5	202	Au	244	No	146	180	180				223
9	Massachusetts	62	4,624	38	132	197	119	4,138	De	4,437	Ja	3,338	4,536	4,457	62	17		2,896
10	Michigan	113	28,098	29	518	1,628	479	25,444	Au	29,006	Ja	20,464	33,884	33,496	376	12		25,938
11	Minnesota	11	175	7	13	21	4	130	Jy	151	Ja	94	143	136	7			331
12	Missouri	17	449	6	38	23	14	368	Jy	427	Ja	299	412	394	18			184
13	Nebraska	6	25	3	3	1		18	My	25	De	13	17	16	1			41
14	New Jersey	24	1,159	8	51	50	26	1,024	De	1,211	Ja	897	1,218	1,202	10	6		1,311
15	New York	113	11,610	59	357	1,067	266	9,861	De	12,073	Jy	8,269	12,218	12,057	150	11		9,398
16	Ohio	75	13,458	42	267	802	217	12,130	De	15,700	Ja	10,034	16,214	15,993	180	37	4	14,433
17	Pennsylvania	44	3,566	29	113	175	50	3,199	De	3,953	Ja	2,349	3,938	3,907	18	13		2,746
18	Texas	4	70	2	5	7		56	Oc	63	Ja ¹	47	52	50	1	1		22
19	Washington	5	22	6	1		1	14	Je	18	Ja ¹	12	14	14				15
20	Wisconsin	30	4,647	18	107	150	74	4,298	De	5,514	Ja	3,482	5,591	5,542	17	32		3,153
21	All other states ²	18	1,249	12	47	139	14	1,037					1,492	1,469	15	8		1,627

¹ Same number reported for one or more other months.

DETAILED STATISTICS, BY STATES: 1909.

	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1	\$173,837,111	\$210,690,666	\$4,740,385	\$4,739,039	\$48,693,867	\$1,661,724	\$128,984,012	\$882,511	\$800,921	\$550,329	\$18,837,878	\$249,202,075	\$117,556,339
2	700,812	1,247,826	41,647	29,671	368,308	10,070	689,858	36,637	5,410	9,520	57,905	1,470,169	770,441
3	125,225	176,073	1,800	8,342	63,949	6,892	51,931	10,128	1,178	2,800	29,053	206,408	147,585
4	12,131,142	9,450,363	343,540	290,013	2,878,187	126,719	4,729,585	25,007	51,291	4,700	981,321	11,668,228	6,811,924
5	4,083,973	6,774,357	267,622	158,547	1,653,186	61,312	3,917,807	96,973	12,110	70,947	535,853	7,153,818	3,174,899
6	16,721,696	22,012,580	389,562	480,130	4,130,674	114,003	14,880,866	41,582	34,022	32,382	1,909,359	23,764,070	8,769,201
7	678,060	540,926	15,976	13,124	145,329	6,708	319,984	4,677	475	.....	35,653	580,106	254,414
8	525,226	468,358	26,372	10,132	118,396	4,376	280,739	360	2,090	.....	25,893	532,761	247,646
9	7,457,889	9,849,642	303,335	193,700	2,793,231	75,400	5,416,078	132,834	50,900	41,943	843,121	11,359,224	5,867,746
10	52,926,297	77,168,738	1,130,784	1,439,111	15,490,755	531,063	53,351,358	99,328	185,038	78,061	4,863,240	96,651,451	42,769,030
11	239,468	409,736	20,840	12,224	75,229	3,075	250,218	12,829	603	.....	34,718	429,286	176,993
12	799,848	1,494,317	59,852	24,993	251,848	8,523	1,016,621	21,856	2,366	4,850	103,408	1,676,840	651,696
13	114,575	49,934	3,600	480	14,545	610	27,637	1,188	376	.....	1,498	57,423	29,176
14	2,702,587	1,876,430	102,287	58,027	615,300	27,898	864,279	23,361	5,878	.....	179,450	2,007,516	1,116,339
15	25,102,473	27,364,888	863,733	739,801	7,016,306	256,504	14,651,598	272,763	47,781	2,873	3,513,529	30,979,527	16,071,425
16	30,891,660	32,192,594	634,690	795,222	7,746,477	248,709	18,273,289	38,778	145,525	220,967	4,088,937	38,838,754	20,316,756
17	6,971,377	6,821,594	210,540	173,918	1,807,802	71,288	3,979,567	45,107	10,157	.....	523,217	6,531,733	2,480,880
18	65,940	187,936	5,100	7,282	39,731	1,110	120,318	5,990	3,107	.....	5,298	183,580	62,162
19	15,794	45,366	1,200	900	15,063	581	21,889	2,652	73	.....	3,008	56,358	33,888
20	8,745,869	9,540,256	236,340	206,793	2,732,951	79,110	5,281,104	8,231	31,952	78,288	905,489	11,440,242	6,100,028
21	2,847,200	3,038,702	81,565	96,629	736,600	28,775	1,879,486	3,230	11,489	3,000	197,928	3,614,581	1,706,320

* All other states embrace: Delaware, 1 establishment; Georgia, 1; Kansas, 4; Kentucky, 2; Oklahoma, 1; Oregon, 2; Rhode Island, 2; South Dakota, 3; Tennessee, 2.

BICYCLES, MOTORCYCLES,
AND PARTS

BICYCLES, MOTORCYCLES, AND PARTS.

Description of the industry.—Some of the establishments in this industry manufacture complete bicycles and motorcycles, themselves making all or most of the parts which enter into the finished products. Some, on the other hand, manufacture only parts, such as saddles, seat posts, frames, gears, handlebars, and chains, while some establishments do little more than assemble parts made by others. The total value of products, by reason of these conditions, involves considerable duplication. At the censuses of 1889, 1899, and 1904 the industry designation was "bicycles and tricycles," and the published reports for those years include the statistics for the output of children's

tricycles and velocipedes, establishments making which were classified under "toys and games" at the census of 1909. The comparability of the general data for the industry, however, is not greatly affected by this change.

Comparison with earlier censuses.—Table 1 summarizes the statistics for the industry for each census from 1889 to 1909, inclusive.

Prior to the census of 1889 the manufacture of bicycles was of such little importance that it did not receive a distinct classification in the census reports, and the statistics were included with those of the carriage and wagon industry.

	NUMBER OR AMOUNT.				PER CENT OF INCREASE. ¹			
	1909	1904	1899	1889	1899-1909	1904-1909	1899-1904	1889-1899
Number of establishments.....	95	101	312	27	-69.6	-5.9	-67.6	1,055.6
Persons engaged in the industry.....	5,017	3,761	19,768	(2)	-74.6	33.4	-81.0	-----
Proprietors and firm members.....	78	81	209	(2)	-62.7	-3.7	-61.2	-----
Salaried employees.....	502	361	2,034	(2)	-75.3	39.1	-82.3	-----
Wage earners (average number).....	4,437	3,319	17,525	1,797	-74.7	33.7	-81.1	875.2
Primary horsepower.....	5,932	5,730	19,847	1,558	-70.1	3.5	-71.1	1,173.9
Capital.....	\$9,780,102	\$5,883,458	\$29,783,659	\$2,058,072	-67.2	66.2	-80.2	1,347.2
Expenses.....	9,569,392	5,525,002	28,987,707	2,066,594	-67.0	73.2	-80.9	1,302.7
Services.....	3,490,561	2,322,201	9,943,052	1,105,728	-64.9	50.3	-76.6	799.2
Salaries.....	582,362	350,798	1,753,235	(2)	-66.8	66.0	-80.0	-----
Wages.....	2,908,199	1,971,403	8,189,817	(2)	-64.5	47.5	-75.9	-----
Materials.....	5,082,569	2,628,146	16,792,051	718,848	-69.7	93.4	-84.3	2,236.0
Miscellaneous.....	996,262	574,655	2,252,604	242,018	-55.8	73.4	-74.5	830.8
Value of products.....	10,698,567	5,153,240	31,915,908	2,568,326	-66.5	107.6	-83.9	1,142.7
Value added by manufacture (value of products less cost of materials).....	5,615,998	2,525,094	15,123,857	1,849,478	-62.9	122.4	-83.3	717.7

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

The evolution of the bicycle from primitive and unserviceable types to a useful and attractive means of travel may be said to have taken place between 1868 and 1890; and its perfection and standardization into practically one form of structure, the modern "safety," between 1890 and 1895. During this latter period the popularity of the bicycle became so widespread that the industry grew very rapidly, but about 1897 it began to decline.

In 1889 there were 27 establishments engaged in the industry, which gave employment to an average of 1,797 wage earners and reported products valued at \$2,568,326. At the census of 1899, after the industry had begun to decline, the average number of wage earners was nearly ten times and the value of products more than twelve times as great as in 1889. During the five-year period ending with 1904 the industry declined very rapidly. The number of establishments decreased from 312 to 101, or 67.6 per cent; the average number of wage earners from 17,525 to 3,319, or 81.1 per cent; the value of products from \$31,915,908 to \$5,153,240, or 83.9 per cent; and the

value added by manufacture (value of products less cost of materials) from \$15,123,857 to \$2,525,094, or 83.3 per cent.

A considerable recovery of the industry as a whole is indicated by the statistics for 1909. While the number of establishments in that year shows a decrease from the number in 1904, the average number of wage earners increased 1,118, or 33.7 per cent, and the value of products, \$5,545,327, or 107.6 per cent. The most important factor in the renewal of activity in the industry has been the growing demand for motorcycles.

Persons engaged in the industry.—Table 2 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners according to age (see Introduction).

The average number of persons engaged in the bicycle and motorcycle industry during 1909 was 5,017, of whom 4,437, or 88.4 per cent, were wage earners. Of the total number of persons engaged in the industry only 3.3 per cent were females.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	5,017	4,853	164
Proprietors and officials.....	206	204	2
Proprietors and firm members.....	78	77	1
Salaried officers of corporations.....	50	50	.....
Superintendents and managers.....	78	77	1
Clerks ¹	374	256	118
Wage earners (average number).....	4,437	4,393	44
16 years of age and over.....	4,353	4,315	38
Under 16 years of age.....	84	78	6

¹ Includes stenographers and other subordinate salaried employees.

In order to compare the distribution of the persons engaged in the industry according to occupational status in 1909 with that in 1904, it is necessary to use the classification employed at the earlier census (see Introduction). Such a comparison is made in Table 3.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				
	1909		1904		Per cent of increase: 1904-1909 ¹
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	5,017	100.0	3,781	100.0	33.4
Proprietors and firm members.....	78	1.6	81	2.2	-3.7
Salaried employees.....	502	10.0	361	9.6	39.1
Wage earners (average number).....	4,437	88.4	3,319	88.2	33.7

¹A minus sign (-) denotes decrease.

Character of ownership.—Table 4 presents data with respect to the character of ownership of the establishments engaged in the industry.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	95	101	\$10,698,567	5,153,240
Individual.....	47	58	538,206	619,368
Firm.....	14	11	227,762	118,531
Corporation.....	34	32	9,934,599	4,515,341
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	49.5	57.4	5.0	10.1
Firm.....	14.7	10.9	2.1	2.3
Corporation.....	35.8	31.7	92.9	87.6

Of the establishments reported in 1909 about half were operated by individuals. The value of the products of such establishments, however, represented only 5 per cent of the total value reported. Nearly all of the business is done by establishments under corporate ownership.

Size of establishments.—Table 5 presents statistics for 1909 and 1904 for establishments classified according to the value of their products.

The table shows a considerable increase in the relative importance of establishments having products valued at \$100,000 and over; this class of establishments reported 90.6 per cent of the total value of products in 1909.

VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	95	101	\$10,698,567	\$5,153,240
Less than \$5,000.....	34	36	94,688	109,996
\$5,000 and less than \$20,000.....	22	33	225,737	296,280
\$20,000 and less than \$100,000.....	17	19	681,434	799,315
\$100,000 and over.....	122	13	9,696,708	3,947,649
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	35.8	35.6	0.9	2.1
\$5,000 and less than \$20,000.....	23.2	32.7	2.1	5.7
\$20,000 and less than \$100,000.....	17.9	18.8	6.4	15.5
\$100,000 and over.....	23.2	12.9	90.6	78.6

¹ Includes two establishments with products valued at more than \$1,000,000, to avoid disclosure of individual operations.

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of manufacture, since they take no account of interest or depreciation, and consequently can not properly be used for determining profits. Facts of interest can, however, be brought out concerning the relative importance of the different classes of expense which were reported. Table 1 shows the total expenses in 1909 to have been \$9,569,392, distributed as follows: Cost of materials, \$5,082,569, or 53.1 per cent; wages, \$2,908,199, or 30.4 per cent; salaries, \$582,362, or 6.1 per cent; and miscellaneous expenses, \$996,262, or 10.4 per cent. It is natural that some pronounced variations from these proportions should appear in certain states, corresponding to differences in the character of the product manufactured. Some establishments produce finished bicycles or motorcycles, themselves making all or most of the parts, some manufacture only parts, and others merely assemble parts made by others.

Engines and power.—The amount of power used in the industry was first reported at the census of 1889. Table 1 shows that the total horsepower used increased from 1,558 in 1889 to 5,932 in 1909. Table 6 shows the number of engines or other motors, according to their character, employed in generating power, and their total horsepower, as reported at the censuses of 1909, 1904, and 1899.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	144	127	241	5,832	5,730	19,847	100.0	100.0	100.0
Owned.....	56	85	241	5,006	5,172	18,082	84.4	90.3	91.1
Steam.....	26	49	177	3,628	4,906	16,853	61.2	85.6	84.9
Gas.....	27	34	45	1,261	231	661	21.3	4.0	3.3
Water wheels.....	2	2	19	115	35	568	1.9	0.8	2.9
Water motors.....	1	.....	.....	2	.....	.....	(¹)	.....	.....
Rented.....	88	42	(²)	926	558	1,765	15.6	9.7	8.9
Electric.....	88	42	(²)	810	336	756	13.7	5.9	3.8
Other.....	.....	.....	.....	116	222	1,009	2.0	3.9	5.1
Electric motors.....	148	92	70	2,534	1,737	2,497	100.0	100.0	100.0
Run by current generated by establishment.....	58	50	70	1,724	1,401	1,741	68.0	80.7	69.7
Run by rented power.....	88	42	(²)	810	336	756	32.0	19.3	30.3

¹ Less than one-tenth of 1 per cent.

² Not reported.

This table indicates that the total primary power decreased from 19,847 horsepower in 1899 to 5,730 in 1904, and afterwards increased slightly, to 5,932 in 1909. Steam power constituted by far the largest proportion of the total primary power at each census, but the proportion which it represented of the total decreased from 84.9 per cent in 1899 to 61.2 per cent in 1909. The power of gas and other internal combustion engines was second in importance in 1909.

Fuel consumed.—Table 7 shows the amount of each kind of fuel consumed in the industry in 1909. The amount expended for fuel and rent of power is shown, by states, in Table 9.

KIND.	Unit.	Quantity.
Anthracite coal.....	Long tons.....	1,471
Bituminous coal.....	Short tons.....	20,481
Coke.....	Short tons.....	380
Wood.....	Cords.....	3
Oil, including gasoline.....	Barrels.....	5,252
Gas.....	1,000 feet.....	49,856

Products.—Table 8 gives a detailed statement of the number and value of the several kinds of bicycles and motorcycles manufactured for 1909, 1904, and 1899.

PRODUCT.	1909	1904	1899
All products,¹ value.....	\$10,698,567	\$5,153,240	\$31,915,808
Bicycles:			
Number.....	168,824	225,309	1,112,880
Value.....	\$2,436,996	\$3,203,505	\$22,127,310
Individual—			
Number.....	168,824	225,203	1,109,423
Value.....	\$2,436,996	\$3,199,222	\$21,925,421
Chain—			
Number.....	168,033	221,528	1,067,524
Value.....	\$2,388,475	\$3,081,206	\$20,031,600
Chainless—			
Number.....	791	3,675	41,899
Value.....	\$48,521	\$118,016	\$1,893,821
Tandem—			
Number.....		106	3,457
Value.....		\$4,283	\$201,889
Tricycles (for adults):			
Number.....		32	328
Value.....		\$3,350	\$17,261
Motorcycles:			
Number.....	18,628	2,300	160
Value.....	\$3,015,988	\$354,980	\$33,674
Individual—			
Number.....	18,496	2,295	159
Value.....	\$2,985,866	\$354,130	\$32,950
Tricars—			
Number.....	132	5	1
Value.....	\$30,122	\$850	\$724
All other products, including parts and repairs.....	\$5,245,583	\$1,591,405	\$9,737,663

¹ In addition, the following products were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation: In 1909, 64,883 bicycles, valued at \$791,193, and other products, including parts, etc., valued at \$579,927; in 1904, 25,178 bicycles, valued at \$537,418; 28 motorcycles, valued at \$4,200 and other products, including parts, valued at \$34,341; and in 1899, 69,811 bicycles, valued at \$1,529,177, and other products, valued at \$24,000.

As already stated, the industry was declining at the census of 1899, yet more than a million bicycles were made in that year. The output in 1904 was barely one-fifth as great and there had been a further decline by 1909. No tandem bicycles or tricycles for adults were manufactured in 1909, although their manufacture had been reported at the two preceding censuses. On the other hand, the development of the motorcycle branch of the industry has practically all taken place within the decade covered by the table, and more particularly in the second half of the decade.

If to the figures shown in the table are added those representing the number and value of bicycles and motorcycles reported as secondary products of other industries, it will be seen that the number of bicycles made decreased from 1,182,691, valued at \$23,656,487, in 1899 to 250,487, with a value of \$3,740,923, in 1904, and 233,707, valued at \$3,228,189, in 1909, while the output of motorcycles increased from 160, valued at \$33,674, in 1899, to 2,328, valued at \$359,180, in 1904, and 18,628, with a value of \$3,015,988, in 1909.

In the value of "all other products, including parts and repairs," the increase from 1904 to 1909 was \$3,654,178. As these parts consist largely of frames, pedals, saddles, handle bars, coaster brakes, etc., and as but few establishments reporting complete bicycles or motorcycles manufacture all the parts, there is necessarily a considerable duplication in the combined value of products of the industry. The extent of this duplication is uncertain, but some idea of it may be obtained from the fact that parts to the value of more than \$2,800,000 were reported by establishments which confined their operations to the manufacture of this class of products. A large proportion of these parts, however, were without doubt sold to bicycle repair shops, the operations of which are not covered by these statistics.

Detailed statistics, by states.—The principal data secured by the census inquiry concerning the manufacture of bicycles, motorcycles, and parts, other than statistics as to the quantity and value of specific products, are presented in Table 9. One or more establishments were reported from 16 states, but the greater part of the value of products were reported from 4 states. Massachusetts ranked first and Ohio second, these two states together contributing nearly one-half the total value of products.

BICYCLES, MOTORCYCLES, AND PARTS—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.				Total.	16 and over.		Under 16.			
					Male.	Female.	Average number.	Number, 15th day of—		Male.		Female.	Male.	Female.			
								Maximum month.	Minimum month.								
United States.....	95	5,017	78	128	258	118	4,437	Je	4,998	Ja	3,891	5,035	4,897	43	88	7	5,932
California.....	5	19	6	1	1	11	De ¹	13	Ja ¹	10	13	12	1	.....	.....	.....	12
Colorado.....	4	13	5	.....	.....	8	Mh ¹	9	De	6	8	7	.....	1	.....	.....	9
Illinois.....	14	1,005	8	12	66	9	Je	1,047	Ja	726	933	929	.....	4	.....	.....	775
Massachusetts.....	10	950	7	21	45	34	De	1,100	Ja	713	1,100	1,066	4	30	.....	.....	899
Minnesota.....	6	71	4	7	1	5	Jy	67	Ja	38	50	50	.....	.....	.....	.....	40
New York.....	20	636	15	24	23	16	My	673	Se	469	604	592	3	9	.....	.....	406
Ohio.....	6	1,037	2	12	58	23	De	1,089	Jy	711	1,181	1,181	.....	.....	.....	.....	1,895
Pennsylvania.....	11	385	10	7	20	7	Je	428	Ja	186	355	352	.....	3	.....	.....	205
All other states ²	19	901	21	44	42	24	.....	.....	.....	.....	791	708	35	41	7	.....	1,691

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States.....	\$9,780,102	\$9,569,392	\$276,409	\$305,953	\$2,808,199	\$121,458	\$4,981,113	\$34,969	\$37,334	\$48,414	\$875,545	\$10,698,587	\$5,615,998
California.....	22,797	25,379	1,525	663	9,208	463	9,613	2,015	95	143	1,654	31,367	21,291
Colorado.....	13,950	25,309	.....	.....	5,326	395	17,825	1,320	93	.....	350	33,365	15,145
Illinois.....	1,276,356	1,755,516	25,322	59,072	600,233	19,099	954,033	9,271	3,088	1,080	90,318	1,777,464	804,332
Massachusetts.....	2,076,835	2,302,332	54,959	98,079	579,565	24,911	1,352,665	2,000	8,119	115	181,919	2,706,258	1,328,662
Minnesota.....	224,113	284,735	9,982	2,596	31,701	1,296	213,731	3,271	733	10,050	11,373	325,520	110,491
New York.....	853,498	1,048,199	52,205	21,771	344,872	11,604	510,406	11,469	1,705	2,555	91,612	1,165,271	643,261
Ohio.....	2,245,317	2,075,493	40,700	53,528	686,355	35,007	1,031,170	1,000	13,410	.....	214,323	2,308,316	1,242,139
Pennsylvania.....	635,429	629,594	16,830	17,560	193,853	6,003	332,873	986	975	.....	61,014	597,071	258,135
All other states ²	2,431,807	1,422,635	74,886	53,684	457,586	22,676	538,797	3,637	9,116	34,471	222,982	1,753,935	1,192,462

¹ Same number reported for one or more other months.² All other states embrace: Connecticut, 4 establishments; Indiana, 2; Iowa, 1; Missouri, 2; New Jersey, 2; North Carolina, 2; Vermont, 1; Wisconsin, 5.

CARRIAGES AND WAGONS
AND MATERIALS

THE CARRIAGE AND WAGON INDUSTRY.

GENERAL STATISTICS.

Summary for the United States: 1909.—The industry "carriages and wagons and materials" includes the manufacture of all varieties of carriages, wagons, sleighs, and sleds (except children's carriages and sleds), and also the manufacture of parts and materials, such as bodies, tops, cushions, hubs, felloes, spokes, wheels, whiffletrees, carriage boots and aprons, axles, dashboards, neck yokes, whip sockets, etc. Many small carriage and wagon repair shops were not canvassed by the census, no such shop being included unless it made five or more complete vehicles during the census year, but a great deal of repair work was done incidentally by the establishments that were canvassed.

Table 1 distinguishes two classes of establishments: (1) Those whose chief products were complete carriages and wagons, and (2) those whose chief products were carriage and wagon parts or materials.

The 5,492 establishments in both branches of the industry gave employment in 1909 to an average of 82,944 persons, of whom 69,928 were wage earners, and paid \$45,555,126 in salaries and wages. The total cost of materials used in 1909 was \$81,951,288, which was equal to about half (51.3 per cent) of the total value of products (\$159,892,547), while the value added to materials by manufacture was \$77,941,259.

A considerable part of the value of products reported represents receipts for repair work.

Of the 5,492 establishments canvassed for 1909, 4,870, or 88.7 per cent, were engaged primarily in the manufacture of carriages and wagons, and of the total value of products, \$125,366,912, or 78.4 per cent, was contributed by this class of establishments.

	Total for the industry.	ESTABLISHMENTS ENGAGED PRIMARILY IN MANUFACTURING—	
		Carriages and wagons.	Carriage and wagon materials.
Number of establishments.....	5,492	4,870	622
Persons engaged in the industry.....	82,944	63,607	19,337
Proprietors and firm members.....	6,213	5,701	512
Salariéd employees.....	6,803	5,366	1,437
Wage earners (average number).....	69,928	52,540	17,388
Primary horsepower.....	125,032	78,735	47,247
Capital.....	\$175,473,728	\$143,230,790	\$32,242,938
Expenses.....	139,176,014	109,052,007	30,124,007
Services.....	45,555,126	35,893,774	9,661,352
Salaries.....	7,960,207	6,272,626	1,687,581
Wages.....	37,594,919	29,621,148	7,973,771
Materials.....	81,951,288	63,890,422	18,060,866
Miscellaneous.....	11,669,600	9,267,811	2,401,789
Value of products.....	159,892,547	125,366,912	34,525,635
Value added by manufacture (value of products less cost of materials).....	77,941,259	61,476,490	16,464,769

Comparison with earlier censuses.—Table 2 summarizes the statistics of the industry for each census from 1879 to 1909, inclusive.

	CARRIAGES AND WAGONS AND MATERIALS.									
	Number or amount.					Per cent of increase. ¹				
	1909	1904	1899	1889	1879	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	5,492	5,588	6,792	5,111	4,253	-19.1	-1.7	-17.7	32.9	20.2
Persons engaged in the industry.....	82,944	90,751	(?)	(?)	(?)	-	-8.6	-	-	-
Proprietors and firm members.....	6,213	6,575	(?)	(?)	(?)	-	-5.5	-	-	-
Salariéd employees.....	6,803	6,294	5,026	(?)	(?)	35.4	8.1	25.2	-	-
Wage earners (average number).....	69,928	77,882	73,812	66,521	52,896	-5.3	-10.2	6.5	(?)	(?)
Primary horsepower.....	125,032	106,189	83,771	49,458	10,813	50.4	18.7	26.7	69.4	357.4
Capital.....	\$175,473,728	\$152,344,657	\$128,961,660	\$106,453,418	\$45,008,211	36.1	15.2	18.1	21.1	136.6
Expenses.....	139,176,014	134,584,694	112,099,699	99,623,941	(?)	24.2	3.4	20.1	12.5	-
Services.....	45,555,126	44,943,700	38,324,427	39,896,254	21,721,619	18.9	1.4	17.3	-3.9	83.7
Salaries.....	7,960,207	6,581,021	4,759,114	(?)	(?)	67.3	21.0	38.3	-	-
Wages.....	37,594,919	38,362,679	33,565,313	(?)	(?)	12.0	-2.0	14.3	-	-
Materials.....	81,951,288	77,527,911	66,771,919	53,410,673	35,378,181	22.7	5.7	16.1	25.0	51.0
Miscellaneous.....	11,669,600	12,113,083	7,003,353	6,317,014	(?)	66.6	-3.7	73.0	10.9	-
Value of products.....	159,892,547	155,868,849	138,261,763	118,942,634	76,065,969	15.6	2.6	12.7	16.2	58.4
Value added by manufacture (value of products less cost of materials).....	77,941,259	78,340,938	71,489,844	65,531,961	39,687,788	9.0	-0.5	9.6	9.1	65.1

¹ A minus sign (—) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The carriage and wagon industry has existed in this country since early colonial times, and its growth up to the census of 1904 about kept pace with the increase of population. The advent of the automobile, and later of the motor truck, has had a decidedly retarding

influence on the industry. Many establishments reported at censuses prior to 1909 or 1904 as manufacturing carriages and wagons have since turned wholly or in part to the manufacture of automobiles and have been assigned to the automobile industry.

during the period from 1899 to 1909 than any other of the leading states, the number of wage earners increasing 34.7 per cent and the value of products 87 per cent. Higher percentages of increase during the period are shown, however, by some of the states of less importance in the industry, particularly Arkansas.

Sixteen of the states for which percentages of increase are given in the table show decreases between 1899 and 1909 in the number of wage earners, 10 in the value of products, and 10 in value added by manufacture. Of the 10 states with the greatest value of products in 1909, Ohio, New York, and Michigan reported a smaller number of wage earners, value of products, and value added by manufacture in that year than in 1899, while Iowa shows decreases in the number of wage earners and value added by manufacture, and Wisconsin a decrease in number of wage earners.

The diagram on page 6 shows graphically the value of products reported for the most important states in the industry in 1909 and 1899, and the map shows the distribution of the industry, by states, for 1909.

Persons engaged in the industry.—Table 4 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners, according to age. The sex and age classification of the average number of wage earners is estimated by the method described in the Introduction.

	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
Carriages and wagons and materials.....	82,944	80,536	2,408
Proprietors and officials.....	8,844	8,706	138
Proprietors and firm members.....	6,213	6,103	110
Salaried officers of corporations.....	1,166	1,143	23
Superintendents and managers.....	1,465	1,460	5
Clerks.....	4,172	2,991	1,181
Wage earners (average number).....	69,928	68,839	1,089
16 years of age and over.....	69,397	68,315	1,082
Under 16 years of age.....	531	524	7
Carriages and wagons.....	63,607	61,827	1,780
Proprietors and officials.....	7,627	7,521	106
Proprietors and firm members.....	5,701	5,613	88
Salaried officers of corporations.....	853	837	16
Superintendents and managers.....	1,073	1,071	2
Clerks.....	3,440	2,494	946
Wage earners (average number).....	52,540	51,812	728
16 years of age and over.....	52,213	51,489	724
Under 16 years of age.....	327	323	4
Carriage and wagon materials.....	19,337	18,709	628
Proprietors and officials.....	1,217	1,185	32
Proprietors and firm members.....	512	490	22
Salaried officers of corporations.....	313	306	7
Superintendents and managers.....	392	389	3
Clerks.....	732	497	235
Wage earners (average number).....	17,388	17,027	361
16 years of age and over.....	17,184	16,826	358
Under 16 years of age.....	204	201	3

The average number of persons engaged in the industry as a whole during 1909 was 82,944, of whom 69,928, or 84.3 per cent, were wage earners, 8,844, or 10.7 per cent, proprietors and officials, and 4,172, or 5 per cent, clerks—the last-named class including other subordinate salaried employees.

Of the total number of persons engaged in the industry, 80,536, or 97.1 per cent, were males and 2,408, or 2.9 per cent, were females. Nearly half of the females were reported as clerks, of which class they constituted 28.3 per cent. The average number of boys under 16 years employed as wage earners was 524, or six-tenths of 1 per cent of the total number of wage earners reported.

There are some differences between the two branches of the industry with respect to the proportions in the several occupational classes and with respect to the sex and age distribution. Relatively more women and children were employed in the manufacture of carriage and wagon materials than in the manufacture of carriages and wagons.

The average number of wage earners in each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 19. The distribution of the average number by sex and age is not shown for the individual states, but Table 20 gives for 1909 such a distribution for the number employed on December 15, or the nearest representative day. Female wage earners were reported from only 26 states, the largest number, 272, being employed in Indiana.

In order to compare the distribution of persons engaged in the industry according to occupational status in 1909 with that in 1904 it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made for the industry as a whole in Table 5.

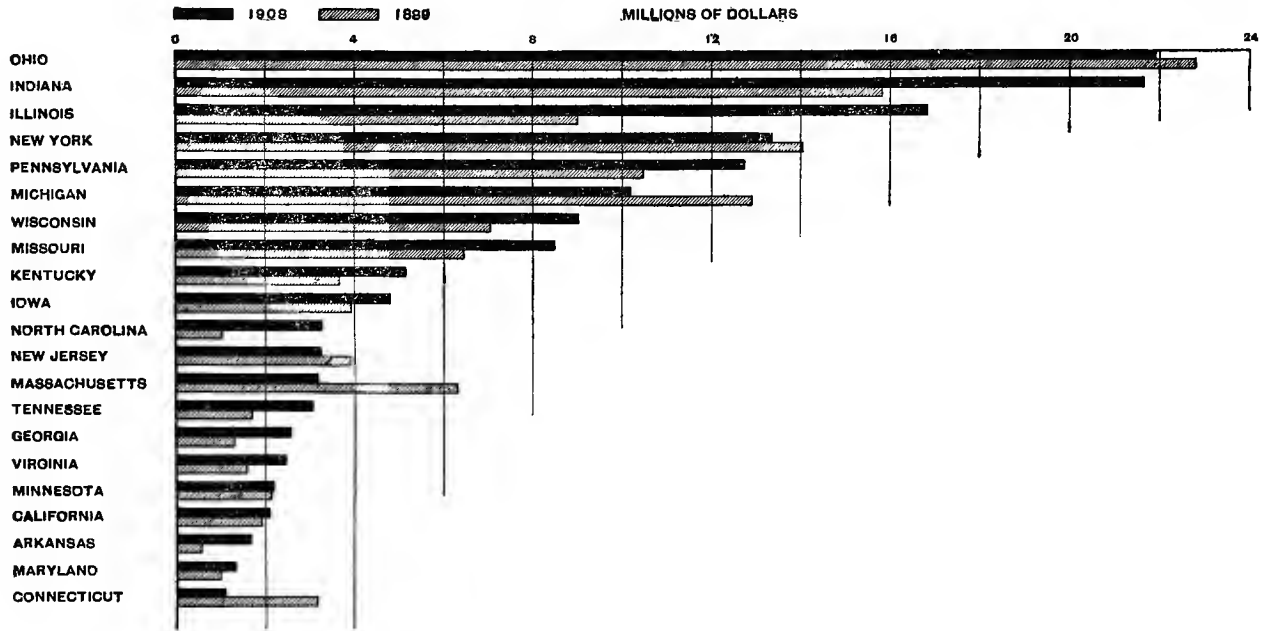
CLASS.	1909		1904		Per cent of increase: ¹ 1904-1909
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	82,944	100.0	90,751	100.0	-8.6
Proprietors and firm members..	6,213	7.5	6,575	7.2	-5.5
Salaried employees.....	6,803	8.2	6,294	6.9	8.1
Wage earners (average number).	69,928	84.3	77,882	85.8	-10.2

¹ A minus sign (-) denotes decrease.

Salaried employees increased 8.1 per cent during the period, proprietors and firm members and wage earners decreasing in number.

Table 6 shows the average number of wage earners in the industry distributed according to age, and in the case of those 16 years of age and over according to sex, for 1909, 1904, and 1899. (See Introduction.) The proportions of men, women, and children employed were practically the same at the three censuses.

THE CARRIAGE AND WAGON INDUSTRY—VALUE OF PRODUCTS, FOR LEADING STATES: 1909 AND 1899.



THE CARRIAGE AND WAGON INDUSTRY—VALUE OF PRODUCTS, BY STATES: 1909.

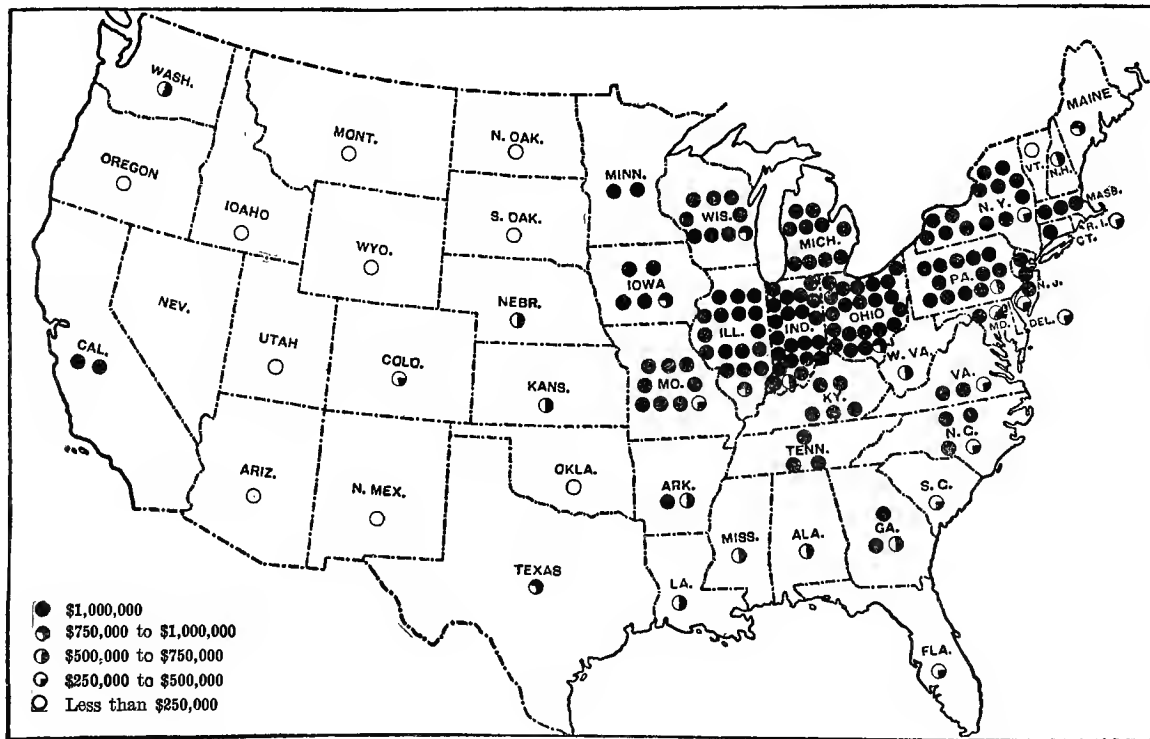


Table 6

AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY—BOTH BRANCHES COMBINED.

CLASS.	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	69,328	100.0	77,882	100.0	73,812	100.0
16 years of age and over..	69,397	99.2	77,146	99.1	73,231	99.2
Male.....	68,315	97.7	75,943	97.5	72,168	97.8
Female.....	1,082	1.5	1,203	1.5	1,073	1.5
Under 16 years of age....	531	0.8	736	0.9	581	0.8

Wage earners employed, by months.—Table 7 gives the number of wage earners employed in the industry as a whole on the 15th (or the nearest representative day) of each month during the year 1909 for

the 21 states in which an average of 500 or more wage earners were employed during the year.

The largest number of wage earners reported for any month of 1909 was 73,240, for May, and the smallest number, 66,567, for January, the minimum number being equal to 90.9 per cent of the maximum. In 1904 the maximum number, 83,753, was reported for April, and the minimum number, 73,413, for November, the latter number being equal to 87.7 per cent of the maximum. Both in 1909 and in 1904 a larger number of wage earners were employed during the spring than during other seasons. Of the 21 states shown for 1909, 7 reported the greatest activity in May and 5 in April, and 13 reported January as the month in which the smallest number was employed.

Table 7

WAGE EARNERS EMPLOYED IN THE INDUSTRY—BOTH BRANCHES COMBINED: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		United States.....	69,328	66,567	68,390	71,776	72,892	73,240	72,181	68,618	68,328	67,894	67,849	68,857	70,427
Arkansas.....	973	<i>887</i>	861	916	889	958	967	965	973	1,098	1,062	1,081	1,080
California.....	760	<i>677</i>	686	719	771	806	821	819	800	785	762	741	729
Connecticut.....	578	<i>521</i>	537	679	625	641	635	605	689	558	556	552	541
Georgia.....	1,059	<i>963</i>	1,010	1,031	1,053	1,024	1,049	984	1,032	1,083	1,072	1,183	1,228
Illinois.....	5,852	<i>5,345</i>	5,738	5,919	6,013	6,099	6,017	5,735	5,724	5,820	5,816	5,933	6,060
Indiana.....	8,867	<i>8,646</i>	9,144	9,429	9,418	9,315	9,100	8,630	8,505	8,390	8,289	8,588	8,956
Iowa.....	1,441	<i>1,323</i>	1,435	1,475	1,589	1,573	1,554	1,518	1,466	1,433	1,323	<i>1,293</i>	1,310
Kentucky.....	2,777	<i>2,740</i>	2,848	2,876	2,913	2,908	2,787	2,759	2,738	2,679	2,648	<i>2,648</i>	2,790
Maryland.....	757	<i>713</i>	726	773	798	794	788	772	764	763	749	718	727
Massachusetts.....	1,539	<i>1,422</i>	1,449	1,565	1,668	1,720	1,714	1,600	1,551	1,521	1,487	1,389	<i>1,388</i>
Michigan.....	4,034	<i>4,073</i>	4,316	4,340	4,347	4,261	4,043	3,772	<i>3,612</i>	3,635	3,794	4,009	4,308
Minnesota.....	868	<i>818</i>	847	894	916	918	909	881	848	833	821	867	864
Missouri.....	3,302	<i>3,035</i>	3,320	3,533	3,548	3,517	3,418	3,332	3,306	3,197	3,172	3,109	3,127
New Jersey.....	1,601	<i>1,497</i>	1,507	1,546	1,610	1,637	1,636	1,651	1,656	1,636	1,622	1,617	1,608
New York.....	6,116	<i>5,933</i>	6,051	6,285	6,342	6,384	6,244	6,111	6,049	<i>5,925</i>	5,932	5,968	6,173
North Carolina.....	1,629	<i>1,536</i>	1,591	1,600	1,651	1,675	1,628	1,579	1,584	1,584	1,625	1,698	1,760
Ohio.....	8,815	<i>8,540</i>	8,943	9,489	9,574	8,598	9,267	8,565	7,941	8,011	8,332	8,472	8,947
Pennsylvania.....	7,498	<i>7,188</i>	7,273	7,446	7,614	7,804	7,932	7,871	7,763	7,233	7,208	7,300	7,344
Tennessee.....	1,706	<i>1,555</i>	1,561	1,677	1,690	1,622	1,743	1,658	1,719	1,795	1,791	1,833	1,822
Virginia.....	1,329	<i>1,225</i>	1,266	1,320	1,328	1,392	1,364	1,304	1,371	1,360	1,331	1,331	1,355
Wisconsin.....	3,437	<i>3,239</i>	3,336	3,389	3,426	3,469	3,501	3,439	3,406	3,510	3,561	3,550	3,417

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The months of maximum and minimum employment for 1909, and the number of wage earners reported for such months, are shown for each state in Table 20.

Prevailing hours of labor.—In Table 8 the wage earners have been classified according to the number of hours of labor per week prevailing in the establishments in which they are employed. In making this classification the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or less number of hours.

Approximately 40 per cent of the wage earners employed in the industry in 1909 were in establishments where the prevailing number of hours was 60 per week. Only 11.6 per cent were employed in establishments where the prevailing hours were less than 54 per week, and less than 1 per cent were in establishments working more than 60 hours per week.

Table 8

AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY—BOTH BRANCHES COMBINED: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	69,328	3,204	4,875	11,659	21,954	27,771	406	59
Arkansas.....	973	10	34	180	746	3	.....	.....
California.....	760	270	48	327	40	72	.....	3
Connecticut.....	578	6	6	288	125	153	.....	.....
Georgia.....	1,059	50	.....	14	142	847	3	3
Illinois.....	5,852	114	82	1,133	3,077	1,442	.....	4
Indiana.....	8,867	198	850	997	4,447	2,375	.....	.....
Iowa.....	1,441	49	157	287	63	765	120	.....
Kentucky.....	2,777	667	37	508	678	886	1	.....
Maryland.....	757	3	54	276	87	337	.....	.....
Massachusetts.....	1,539	18	498	704	172	147	.....	.....
Michigan.....	4,034	55	.....	53	2,105	1,821	.....	.....
Minnesota.....	868	3	25	36	182	622	.....	.....
Missouri.....	3,302	471	182	831	417	1,220	130	1
New Jersey.....	1,601	51	116	407	669	339	18	1
New York.....	6,116	224	1,410	1,329	1,235	1,918	.....	.....
North Carolina.....	1,629	19	8	32	252	1,306	4	8
Ohio.....	8,815	641	651	1,634	1,993	3,896	.....	.....
Pennsylvania.....	7,498	44	165	826	3,686	2,752	19	6
Tennessee.....	1,706	102	89	100	201	1,211	1	2
Virginia.....	1,329	3	7	343	168	788	9	11
Wisconsin.....	3,437	8	.....	119	1,241	2,069	.....	.....

Sixty hours per week was the most common working time reported in 13 of the 21 states for which separate data are shown. Three states, however—Massachusetts, California, and Connecticut—had more than half of their wage earners in establishments operating 54 hours or less per week; and California reported over one-third as employed in establishments operating 48 hours or less per week. Only 12 of the 21 states reported any wage earners working over 60 hours per week.

Character of ownership.—Table 9 presents data with respect to the character of ownership of the establishments in the industry.

The most important distinction shown is that between corporate and all other forms of ownership. In 1909, of the total number of establishments reported, 16.1 per cent were under corporate ownership, as compared with 14.4 per cent in 1904. While corporations thus controlled approximately one-sixth of the total number of establishments in 1909, the value of the products of these establishments represented 68.4 per cent of the total value of products of the industry, an appreciably larger proportion than in

1904. There was a pronounced decrease between 1904 and 1909 both in the number of establishments operated by firms and in the value of their products. There was a slight increase in the number of establishments operated by individuals but a decrease in value of their products.

Table 9

CHARACTER OF OWNERSHIP.	CARRIAGES AND WAGONS AND MATERIALS.			
	Number of establishments.		Value of products.	
	1909	1904	1900	1904
Total.....	5,492	5,588	\$159,892,547	\$156,868,849
Individual.....	3,322	3,315	29,460,382	32,376,377
Firm.....	1,286	1,467	21,084,158	12,597,546
Corporation.....	884	806	109,348,007	96,894,926
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	60.5	59.3	18.4	20.8
Firm.....	23.4	26.3	13.2	17.1
Corporation.....	16.1	14.4	68.4	62.2

¹ Includes two establishments reported under "other" ownership, to avoid disclosure of individual operations.

Table 10 gives statistics for establishments under each form of ownership, for the leading states.

Table 10

STATE.	CARRIAGES AND WAGONS AND MATERIALS: 1909											
	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States.....	9,322	1,286	884	15,476	9,824	44,628	\$29,460,382	\$21,084,156	\$109,348,007	\$17,594,760	\$11,267,135	\$49,049,364
Arkansas.....	19	18	21	119	164	690	155,646	277,761	1,231,060	105,785	165,027	578,999
California.....	101	39	15	418	163	179	1,143,932	454,141	454,261	649,534	282,550	271,284
Connecticut.....	63	18	11	313	87	178	559,631	174,592	342,359	363,054	120,480	210,407
Georgia.....	45	17	21	291	139	629	476,012	290,763	1,793,256	284,983	159,607	748,039
Illinois.....	201	69	55	797	421	4,634	1,714,435	1,052,885	14,063,963	1,000,483	586,986	5,764,479
Indiana.....	94	47	60	487	361	8,019	843,535	874,212	19,937,693	504,928	404,414	8,288,375
Iowa.....	64	35	20	263	393	795	522,717	1,541,056	2,722,548	304,702	712,184	1,021,924
Kentucky.....	80	41	40	376	338	2,063	639,403	556,128	3,945,578	335,009	292,871	1,800,721
Maryland.....	86	31	9	308	201	253	532,666	390,910	406,483	316,756	218,404	253,730
Massachusetts.....	129	34	14	841	443	255	1,618,801	1,046,547	519,487	1,038,312	562,243	302,499
Michigan.....	124	52	36	348	514	3,172	714,140	935,267	8,509,476	437,434	546,982	3,912,211
Minnesota.....	92	30	12	220	180	468	499,642	430,165	1,244,898	317,891	241,503	632,313
Missouri.....	109	70	64	417	368	2,517	721,434	767,542	6,978,880	448,509	428,870	2,731,547
New Jersey.....	192	50	14	882	344	375	1,983,819	610,052	656,585	1,172,471	401,129	397,097
New York.....	414	131	65	2,116	916	3,084	4,434,217	1,805,750	7,232,564	2,661,493	1,057,207	3,765,113
North Carolina.....	71	38	29	423	406	800	692,098	743,277	1,847,259	344,073	336,833	708,222
Ohio.....	183	97	127	1,256	1,164	6,395	2,345,765	2,858,841	16,744,853	1,348,446	1,312,097	7,874,915
Pennsylvania.....	437	153	65	2,329	1,389	3,780	3,936,477	2,695,014	6,116,892	2,399,065	1,403,898	3,238,395
Tennessee.....	46	44	39	284	297	1,125	404,778	505,542	2,129,293	216,434	307,182	1,076,621
Virginia.....	80	27	23	325	246	758	389,204	392,928	1,703,089	225,556	241,896	734,489
Wisconsin.....	184	70	32	457	249	2,731	987,657	820,939	7,090,575	537,027	315,695	2,688,650

In 1909, of the total number of wage earners in the industry, 15,476, or 22.1 per cent of the total, were employed in establishments under individual ownership; 9,824, or 14 per cent, in those under firm ownership; and 44,628, or 63.8 per cent, in those owned by corporations.

There was considerable variation among the states in the relative importance of the establishments under the different forms of ownership. Thus in Indiana, the second state in the industry as measured by value of products, establishments controlled by corporations constituted 36.2 per cent of the total number of

establishments, gave employment to 90.4 per cent of the wage earners, and reported 92.1 per cent of the total value of products. In Massachusetts, on the other hand, corporations controlled only 7.9 per cent of the establishments, and these gave employment to but 16.6 per cent of the wage earners, and contributed only 16.3 per cent of the total value of products. In Ohio, which led all other states in value of products, corporations controlled 31.2 per cent of the total number of establishments, reported 76.3 per cent of the total value of products, and gave employment to 72.5 per cent of the wage earners.

Size of establishments.—Table 11 presents statistics for establishments in the industry as a whole, classified according to the value of their products.

VALUE OF PRODUCTS PER ESTABLISHMENT.	CARRIAGES AND WAGONS AND MATERIALS.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total.....	5,492	5,538	\$159,892,547	\$155,868,849
Less than \$5,000.....	2,114	2,098	5,458,031	5,774,443
\$5,000 and less than \$20,000.....	2,222	2,301	22,138,144	22,341,719
\$20,000 and less than \$100,000.....	845	859	35,231,090	34,920,022
\$100,000 and less than \$1,000,000.....	293	322	73,089,147	78,875,449
\$1,000,000 and over.....	13	8	23,926,135	13,957,216
Per cent of total.....	190.9	100.0	100.0	100.0
Less than \$5,000.....	38.5	37.6	3.4	3.7
\$5,000 and less than \$20,000.....	40.5	41.2	13.8	14.3
\$20,000 and less than \$100,000.....	15.4	15.4	22.1	22.4
\$100,000 and less than \$1,000,000.....	5.4	5.8	45.7	50.6
\$1,000,000 and over.....	0.2	0.1	15.0	9.0

Of the 5,492 establishments reported for 1909, only 13 manufactured products valued at \$1,000,000 or over. In 1904 there were eight establishments of this class. Such establishments, however, reported 15 per cent of the total value of products in 1909 and 9 per cent in 1904. None of the other groups reported as large a percentage of the total value of products in

1909 as in 1904. Establishments whose products exceeded \$100,000 but were less than \$1,000,000 in value represented only 5.4 per cent of the total number of establishments, but reported 45.7 per cent of the total value of products in 1909. On the other hand, the small establishments—that is, those manufacturing products valued at less than \$20,000—constituted almost four-fifths (79 per cent) of the total number of establishments, but the value of their products was less than one-fifth (17.3 per cent) of the total.

The average value of products per establishment increased from \$27,893 in 1904 to \$29,114 in 1909, and the average value added by manufacture, as computed from the figures in Table 2, from \$14,019 to \$14,192, but the average number of wage earners per establishment shows a decrease from 13.9 in 1904 to 12.7 in 1909. In the carriage and wagon branch of the industry in 1909 the average value of products per establishment was \$25,743 and the average number of wage earners was 10.8. The corresponding figures for establishments making primarily carriage and wagon parts and materials were \$55,507 and 28.

Table 12 presents a classification of establishments according to the number of wage earners employed, for the leading states.

STATE.	CARRIAGES AND WAGONS AND MATERIALS: 1909																		
	Total.		Establishments employing—																
			No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
Es-tab-lish-ments.	Wage earners (average number)	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States.....	5,492	69,928	440	2,988	7,890	1,460	15,451	325	10,645	159	11,129	81	12,178	17	5,551	8	3,339	2	3,954
Arkansas.....	58	973	2	23	52	18	199	11	341	2	132	2	249						
California.....	155	760	5	110	294	37	392	3	74										
Connecticut.....	92	578	3	57	161	27	261	5	156										
Georgia.....	83	1,059	3	37	108	28	307	11	356	4	288								
Illinois.....	325	5,852	25	191	496	68	709	17	539	11	729	7	1,217	5	1,642	1	520		
Indiana.....	221	8,867	11	86	230	65	711	27	877	15	1,018	11	1,552	4	1,185	1	682	1	2,612
Iowa.....	119	1,441	13	59	156	34	367	7	280	3	193	3	445						
Kentucky.....	161	2,777	4	87	213	46	479	11	395	7	423	5	750			1	517		
Maryland.....	126	757	11	78	183	28	259	7	189	2	126								
Massachusetts.....	177	1,539	10	85	249	65	697	15	446	2	147								
Michigan.....	212	4,034	31	115	247	36	343	9	288	12	825	4	582	4	1,245	1	504		
Minnesota.....	134	868	22	89	200	13	133	6	201	3	221	1	113						
Missouri.....	243	3,302	22	130	334	61	643	16	555	9	629	4	603			1	538		
New Jersey.....	256	1,601	7	169	432	70	733	6	181	4	255								
New York.....	610	6,116	55	349	913	154	1,612	26	819	18	1,288	7	1,116	1	368				
North Carolina.....	138	1,629	7	70	150	38	412	17	557	5	408	1	102						
Ohio.....	407	8,815	9	167	511	135	1,449	48	1,706	27	1,983	21	3,166						
Pennsylvania.....	655	7,498	56	343	953	203	2,038	31	975	14	953	6	982	1	255			1	1,342
Tennessee.....	129	1,706	2	65	168	43	613	12	404	6	498	1	123						
Virginia.....	130	1,329	10	71	164	37	431	4	144	7	473	1	117						
Wisconsin.....	286	3,437	65	163	341	38	411	11	355	1	68	5	828	2	856	1	578		

Of the 5,492 establishments reported in 1909, 8 per cent employed no wage earners; 54.6 per cent employed from 1 to 5; 26.7 per cent from 6 to 20; and 5.9 per cent from 21 to 50. There were 159 establishments that employed from 51 to 100 wage earners, and 106 that employed over 100, of which 25 employed over 250. Most of these 25 large concerns were in Illinois, Indiana, and Michigan.

Of the total number of wage earners, 33.1 per cent were reported by establishments employing from

1 to 20, 31.1 per cent by establishments employing from 21 to 100, 25.4 per cent by establishments employing from 101 to 500, and 10.4 per cent by establishments employing more than 500 wage earners each.

Expenses.—As stated in the Introduction, the census statistics of expenses do not purport to give the total cost of manufacture, since they take no account of interest or depreciation. Facts of interest can be brought out, however, concerning the relative impor-

tance of the different classes of expenses which were reported. Table 2 shows the total expenses reported for the industry as a whole in 1909 to have been \$139,176,014, divided as follows: Materials, \$81,951,288, or 58.9 per cent; wages, \$37,594,919, or 27 per cent; salaries, \$7,960,207, or 5.7 per cent; and miscellaneous expenses, made up of taxes, rent of factory or works, advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$11,669,600, or 8.4 per cent. The percentages represented by the several classes of expenses are shown for each of the two branches of the industry in Table 13.

CLASS OF EXPENSES.	PER CENT OF TOTAL REPORTED EXPENSES: 1909		
	The industry as a whole.	Carriages and wagons.	Carriage and wagon materials.
Total	100.0	100.0	100.0
Cost of materials.....	58.9	58.6	60.0
Salaries.....	5.7	5.8	5.6
Wages.....	27.0	27.2	26.5
Miscellaneous.....	8.4	8.5	8.0

There were considerable variations in the proportions represented by the different classes of expenses in the several states (see Table 20). Among the 21 principal states the proportion of the total expenses represented by salaries ranged from 3.2 per cent in New Jersey to 7 per cent in Kentucky; that represented by wages varied from 20.1 per cent in Iowa to 42.6 per cent in Connecticut; that represented by cost of materials from 43.8 per cent in Connecticut to 66.9 per cent in North Carolina; and that represented by miscellaneous expenses from 6.5 per cent in North Carolina to 11.1 per cent in Michigan. Variations in the proportions may in a measure be accounted for by the varying importance of repair work. In this branch of work few and inexpensive materials are used, while the element of labor, and consequently of wages, is very important. Thus in Connecticut, where a large proportion of the value of products represents receipts for repair work, the proportion of the total expenses formed by wages was above the average for the industry as a whole, while the proportion for cost of materials was considerably less than the average. Some establishments, on the other hand, make extensive use of parts purchased from other establishments, their work consisting largely of assembling. In such cases comparatively little labor is required and the cost of materials constitutes a very large proportion of the total expenses.

Engines and power.—The amount of power used in the industry was first reported at the census of 1869. Table 2 shows that the total horsepower used increased from 10,813 in 1879 to 126,032 in 1909. Table 14 shows the number of engines or other motors, according to their character, employed in generating power (including electric motors operated by pur-

chased current), and their total horsepower, as reported at the censuses of 1909, 1904, and 1899. It also shows separately the total number and horsepower of electric motors, including those operated by current generated in the same establishment.

Table 14

POWER.	CARRIAGES AND WAGONS AND MATERIALS.								
	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	6,501	2,496	2,219	126,032	106,159	83,771	100.0	100.0	100.0
Owned.....	2,647	2,496	2,219	100,715	96,144	79,322	79.9	90.6	94.7
Steam.....	1,217	1,491	1,668	82,911	82,414	70,864	85.8	77.6	84.6
Gas.....	1,294	858	394	13,120	9,739	4,218	10.4	9.2	5.0
Water wheels.....	127	127	157	4,604	3,837	3,842	3.7	3.6	4.6
Water motors.....	9	20	(¹)	63	80	(¹)	(²)	0.1	.....
Other.....	.....	.....	.....	17	74	398	(²)	0.1	0.5
Rented.....	3,854	(²)	(¹)	25,317	10,015	4,449	20.1	9.4	5.3
Electric.....	3,854	(²)	(¹)	24,969	8,780	3,014	19.8	8.3	3.6
Other.....	.....	.....	.....	348	1,235	1,435	0.3	1.1	1.7
Electric motors	4,805	507	158	39,424	18,434	5,805	100.0	100.0	100.0
Run by current generated by establishment.....	951	507	156	14,455	7,654	2,791	36.7	46.6	48.1
Run by rented power.....	3,854	(²)	(¹)	24,969	8,780	3,014	63.3	53.4	51.9

¹ Not reported. ² Less than one-tenth of 1 per cent. ³ Figures not available.

The total primary power used in the industry increased from 83,771 horsepower in 1899 to 126,032 horsepower in 1909, or by 50.4 per cent. The most noticeable increase was in the power of electric motors operated by purchased current, which constituted 19.8 per cent of all power used in 1909, as compared with 3.6 per cent in 1899. There was also a marked increase in the relative importance of gas and other internal combustion engines. In 1909 the power of steam engines constituted by far the largest percentage of the total primary power, but it was relatively of much less importance in that year than in 1899.

The number and horsepower of electric motors run by current generated in the establishment also showed a very decided increase, although less relatively than in the case of motors operated by purchased current.

Table 15 shows for 1909 the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in each of the 21 leading states.

The states which ranked highest with respect to the amount of power used in 1909 were Ohio, Indiana, Pennsylvania, New York, and Illinois, the five states which ranked highest in value of products. The total primary horsepower reported for these states in 1909 was 59,818, or 47.5 per cent of the total for the United States. In all of the 21 states except California, Massachusetts, and North Carolina steam was the most important primary power; in these three states rented electric power was most important. Gas and other internal combustion engines were more extensively used in Pennsylvania than in any other state.

Fuel consumed.—As shown by Table 15, bituminous coal was the principal class of fuel used during 1909, 451,304 short tons being consumed, of which amount

Indiana used 20.5 per cent. Gas was also used to a considerable extent, the largest quantity for any state being reported from Pennsylvania.

Table 15

CARRIAGES AND WAGONS AND MATERIALS: 1909

STATE.	Primary horsepower.							Electric horsepower.		Fuel used.							
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States.....	3,583	128,032	100,715	82,911	13,120	4,667	17	24,969	348	39,424	14,455	62,258	451,304	18,741	13,603	44,178	477,367
Arkansas.....	47	3,749	3,628	3,560	68	.....	.....	121	.....	231	110	70	1,130	.....	78	79	38,381
California.....	118	957	110	19	82	9	.....	847	.....	847	.....	218	1,617	.....	48	464	1,244
Connecticut.....	59	957	700	408	115	177	.....	257	.....	257	.....	832	1,752	2	177	.....	6,446
Georgia.....	47	1,353	946	797	149	.....	.....	407	.....	802	395	70	3,927	16	.....	267	44
Illinois.....	239	9,684	7,136	5,963	583	590	.....	2,548	.....	3,895	1,347	637	47,599	3,483	97	6,745	3,122
Indiana.....	171	13,790	12,127	11,498	631	.....	.....	1,663	.....	5,596	3,933	78	92,661	1,421	907	17,458	5,730
Iowa.....	95	2,387	1,843	1,537	306	.....	.....	524	20	526	2	65	12,979	587	105	1,951	545
Kentucky.....	101	6,617	6,151	6,003	148	.....	.....	431	35	2,783	2,362	9	29,214	952	1,222	141	617
Maryland.....	55	879	601	500	101	.....	.....	278	.....	290	12	482	2,383	.....	33	115	457
Massachusetts.....	134	2,038	1,175	780	310	73	12	826	37	828	.....	858	4,632	45	249	454	37,569
Michigan.....	139	6,362	5,291	4,730	359	202	.....	1,061	10	1,610	549	126	35,477	633	1,619	765	76
Minnesota.....	97	1,657	1,271	872	399	.....	.....	380	6	522	142	288	5,354	132	233	397	136
Missouri.....	176	5,858	5,167	4,642	520	.....	5	691	.....	939	248	172	14,056	165	1,105	467	3,442
New Jersey.....	123	1,645	1,311	865	372	74	.....	333	1	345	12	2,178	4,992	17	31	228	3,435
New York.....	352	10,029	8,391	5,278	1,302	1,811	.....	1,582	56	1,796	214	5,705	28,110	301	1,123	2,087	22,511
North Carolina.....	83	9,110	1,886	1,649	210	27	.....	7,224	.....	7,224	.....	722	3,985	75	2,458	334	.....
Ohio.....	299	14,771	13,546	11,686	1,847	13	.....	1,222	3	3,578	2,356	204	81,415	5,986	101	4,833	63,790
Pennsylvania.....	388	11,544	10,267	7,281	2,816	170	.....	1,166	111	2,740	1,574	36,240	30,824	1,291	200	1,882	107,446
Tennessee.....	91	4,537	4,267	4,060	167	40	.....	217	53	327	110	12	5,736	617	652	303	600
Virginia.....	66	2,032	1,726	1,435	194	97	.....	306	.....	308	2	34	4,879	80	716	228	141
Wisconsin.....	196	6,426	6,091	5,137	868	86	.....	335	.....	1,413	1,078	2,284	24,012	2,379	793	1,554	1,371
All other states.....	507	9,650	7,084	4,213	1,573	1,298	.....	2,550	16	2,569	19	974	14,640	559	1,556	3,283	181,324

SPECIAL STATISTICS REGARDING PRODUCTS.

The United States a whole.—Table 16 presents statistics regarding the number and value of vehicles and the value of all other products, not only for establishments assigned to the industry "carriages and wagons and materials," but also for establishments in other industries which incidentally reported the manufacture of carriages and wagons or parts and materials.

KIND.	PRODUCTS.					
	Total.		Made by establishments in the industry.		Made by establishments in other industries.	
	Number.	Value.	Number.	Value.	Number.	Value.
All products.....		\$164,420,558		\$159,892,547		\$4,528,011
All vehicles: ¹						
1900.....	1,585,115	94,607,019	1,519,782	91,263,264	65,333	3,343,755
1904.....	.....	97,802,866	1,711,529	97,190,693	.....	612,173
Classes of vehicles, 1909:						
Carriages.....	843,319	48,835,053	828,411	47,756,118	14,908	1,078,935
Wagons.....	629,797	42,026,198	587,685	39,932,910	42,112	2,093,288
Public conveyances.....	2,327	944,882	2,243	939,267	104	5,615
Sleighs and sleds.....	109,108	2,231,767	100,899	2,068,850	8,209	165,917
Automobiles ¹	544	569,119	544	569,119	.....	.....
All other products, parts, repairs, etc., 1909.....	.....	69,813,539	.....	68,629,283	.....	1,184,256

¹ Exclusive of automobiles made by establishments not in the carriage and wagon industry.

The value of products reported for the industry itself in 1909 was \$159,892,547, and the value of similar products reported by establishments in other industries was \$4,528,011, giving a total of \$164,420,558. The number of vehicles made by establishments in the industry was

1,519,782 (this number including 544 automobiles), and by establishments in other industries (not including automobiles) 65,333, giving a total of 1,585,115.

The establishments in other industries which reported the production of carriages, wagons, etc., or parts thereof included establishments in the agricultural implement, automobile, foundry and machine-shop, lumber, and other industries. With respect to the item of \$1,184,256 reported as the value of carriage and wagon parts, repairs, etc., made by establishments in other industries, it should be stated that this is probably much less than the true value of carriage and wagon parts so made. Doubtless concerns which made the more important kinds of parts in considerable quantities reported them separately. The concerns making minor parts, particularly if they made them in small quantities, would be less likely to report them. Moreover, there are many articles which can be used as parts or materials in the carriage and wagon industry but which are also equally adapted for use in other industries.

At the census of 1904 detailed statistics were not secured regarding vehicles or parts manufactured by establishments outside of the carriage and wagon industry proper, but the total value of vehicles reported as made by such establishments, \$612,173, is shown in Table 16.

Table 17 presents, for 1909, 1904, and 1899, detailed statistics regarding the products of the establishments in the industry "carriages and wagons and materials."

Table 17 PRODUCT.	1909	1904	1899
Total value of products.....	\$159,892,547	\$155,863,849	\$138,261,763
Complete vehicles of all classes:			
Number.....	1,519,782	1,711,529	1,594,465
Value.....	\$91,263,264	\$97,190,693	\$85,910,177
Carriages (family and pleasure):			
Number.....	828,411	937,409	904,639
Value.....	\$47,756,118	\$55,750,276	\$51,295,393
Two-wheeled, number.....	63,532	29,544	29,089
Four-wheeled, for one or two persons, number.....	637,898	769,635	728,163
Four-wheeled, for three or more per- sons, number.....	126,981	138,230	147,387
Wagons:			
Number.....	587,685	643,755	570,428
Value.....	\$39,932,910	\$37,195,230	\$31,080,738
Business—			
Number.....	154,631	133,422	(¹)
Value.....	\$16,440,816	(¹)	(¹)
Light and package commodity, number.....	107,190	71,733	(¹)
Heavy and bulk commodity, number.....	32,780	31,956	(¹)
Handcarts, number.....	7,330	6,089	(¹)
Hearses, number.....	807	642	(¹)
Street sprinklers, number.....	952	109	(¹)
Street sweepers, number.....	101	48	(¹)
Other business wagons, number.....	5,471	22,845	(¹)
Farm (including carts or trucks)—			
Number.....	429,952	505,025	(¹)
Value.....	\$22,615,875	(¹)	(¹)
Government, municipal, etc.—			
Number.....	3,102	5,308	(¹)
Value.....	\$876,219	(¹)	(¹)
Ambulances, number.....	598	245	(¹)
Mail and mail carriers' wagons and carts, number.....	1,912	4,703	(¹)
Patrol (fire and police), hose wagons, and prison vans, number.....	592	360	(¹)
Public conveyances:			
Number.....	2,243	2,711	2,218
Value.....	\$989,267	\$1,314,952	\$1,114,090
Cabs, hacks, and hansoms, number.....	1,715	1,888	1,808
Hotel coaches, omnibuses, etc., number.....	528	823	410
Sleighs and sleds:			
Number.....	100,899	127,455	117,006
Value.....	\$2,065,850	\$2,694,560	\$2,290,903
Automobiles: ²			
Number.....	544	199	174
Value.....	\$569,119	\$235,675	\$129,053
Electric, number.....	46	(¹)	(¹)
Gasoline, number.....	498	(¹)	(¹)
All other products, including parts and amount received for repair work.....	\$68,629,283	\$58,678,156	\$52,351,586

¹ Not reported separately.

² Manufactured in establishments devoted primarily to the manufacture of carriages and wagons.

The total value of products shown for the industry at each census involves a certain amount of duplication, due to the fact that carriage and wagon parts and materials manufactured by certain establishments in the industry are used by other establishments in the industry in making the completed vehicles. As shown in Table 1, the total value of products of establishments engaged exclusively or primarily in manufacturing carriage and wagon parts and materials in 1909 was \$34,525,635; the greater part of the products represented by this amount were doubtless used as materials in the industry, though some were, of course, used in small repair shops.

Of the total value of products of the industry in 1909, which amounted to \$159,892,547, the value of complete vehicles of all classes represented \$91,263,264, or 57.1 per cent, and the value of all other products, consisting chiefly of the value of parts and repair work, was \$68,629,283. The value of vehicles includes \$569,119 representing the value of automobiles made by establishments engaged primarily in the manufacture of carriages and wagons, but the great bulk of it

represents the value of carriages, wagons, sleighs, and sleds. Of the total value of vehicles turned out in 1909, that of family and pleasure carriages formed 52.3 per cent, that of wagons of all kinds 43.8 per cent, that of public conveyances 1 per cent, and that of sleighs and sleds 2.3 per cent.

The number of complete vehicles of all classes manufactured by the establishments in the industry increased from 1,594,465 in 1899 to 1,711,529 in 1904, but decreased to 1,519,782 in 1909, the decrease for the decade being 4.7 per cent, and that for the five-year period 1904-1909, 11.2 per cent. The value of the vehicles manufactured, however, was somewhat greater in 1909 than in 1899. This may be due to an increase in prices of vehicles, but it might readily be attributable, at least in part, to changes in the relative proportions of different classes and grades from the one year to the other. It should be noted, in fact, that each of the classes of vehicles listed in Table 17 includes a variety of types and grades, so that even if values were shown for each class, a comparison of the percentage of increase in the number with the percentage of increase in value would throw little light on the question of the movement of prices.

Between 1899 and 1904 the aggregate number and the value of family and pleasure carriages manufactured increased somewhat, but the number in 1909 was 8.4 per cent less than that in 1899 and the value 6.9 per cent less. Of the family and pleasure carriages, only those with two wheels show an increase in number during the decade.

The aggregate number and value of wagons manufactured increased materially from 1899 to 1904. The number, however, decreased between 1904 and 1909, although the value increased somewhat. The number of wagons made in 1909 was 3 per cent greater than the number made in 1899, and the value 28.5 per cent greater; as compared with 1904, however, there was a decrease of 8.7 per cent in number, and an increase of only 7.4 per cent in value.

The number of public conveyances manufactured also increased during the first five-year period, but decreased almost as much during the second period, and the value of such conveyances made in 1909 was less than in either of the two preceding census years. As before stated, the decrease between 1904 and 1909 in the number of carriages, wagons, and public conveyances manufactured is doubtless attributable to the increasing use of the automobile.

The number of sleighs and sleds manufactured shows a movement similar to that of carriages. It increased from 1899 to 1904, but decreased during the next five years, and in 1909 was 13.8 per cent less than in 1899.

The value of "all other products," consisting chiefly of the value of parts and the receipts for repair work, increased 31.1 per cent between 1899 and 1909.

It may be stated that, of the total value of products of establishments engaged primarily in manufacturing parts and materials, which amounted to \$34,525,635

in 1909, much the greater part is included in the item of \$68,629,283 shown in Table 17 as the value of "all other products." It is probable, therefore, that the value of "all other products" for establishments making complete vehicles was from \$35,000,000 to \$40,000,000, and that most of this represented receipts for repair work.

Vehicles turned out, by states.—Table 18 shows, by states, the number of the several general classes of vehicles manufactured by establishments in the carriage and wagon industry during 1909, 1904, and 1899, and the value of those manufactured during 1909. Data for establishments assigned to other industries are not included.

CARRIAGES AND WAGONS AND MATERIALS—VEHICLES MANUFACTURED, BY STATES.

Table 18 CLASS OF VEHICLES AND STATE.	NUMBER.			Value: 1909	CLASS OF VEHICLES AND STATE.	NUMBER.			Value: 1909
	1909	1904	1899			1909	1904	1899	
CARRIAGES (FAMILY AND PLEASURE.)					WAGONS (BUSINESS, ETC.)—contd.				
United States.....	828,411	937,409	904,639	\$47,756,118	Michigan.....	28,720	52,273	49,903	\$1,586,172
California.....	386	2,160	2,418	39,440	Minnesota.....	17,231	15,059	16,924	1,040,586
Connecticut.....	277	2,351	2,940	42,426	Mississippi.....	1,683	2,012	833	170,601
Georgia.....	21,974	20,919	7,509	1,221,340	Missouri.....	20,140	25,281	24,621	1,388,699
Illinois.....	101,875	56,075	50,979	5,907,089	Nebraska.....	1,074	916	203	111,047
Indiana.....	177,194	178,962	141,734	10,150,893	New Hampshire.....	1,049	1,188	2,394	191,965
Iowa.....	29,809	16,498	20,593	2,100,313	New Jersey.....	4,337	5,647	7,589	655,800
Kentucky.....	24,259	27,195	11,784	1,120,253	New York.....	21,937	19,879	22,775	2,932,813
Maine.....	2,551	2,802	2,294	200,268	North Carolina.....	26,248	23,553	12,316	852,983
Maryland.....	1,708	2,945	3,091	163,336	Ohio.....	28,882	40,905	44,315	2,733,606
Massachusetts.....	2,311	8,106	11,883	278,959	Pennsylvania.....	33,634	35,395	27,138	2,996,485
Michigan.....	91,558	174,889	193,254	4,453,090	Tennessee.....	12,499	20,241	11,666	716,597
Minnesota.....	1,880	3,662	6,361	81,999	Texas.....	1,243	718	1,050	164,623
Missouri.....	97,444	74,650	52,823	3,913,969	Virginia.....	18,835	19,195	9,638	775,528
New Hampshire.....	906	1,943	2,240	440,449	West Virginia.....	2,906	5,117	3,702	176,613
New Jersey.....	5,465	3,341	6,944	2,344,487	Wisconsin.....	92,011	83,916	70,210	4,853,561
New York.....	25,474	42,249	58,176	1,883,206	All other states.....	4,714	5,686	7,577	589,651
North Carolina.....	31,813	25,157	9,447	8,126,285	PUBLIC CONVEYANCES.				
Ohio.....	135,877	199,423	213,692	1,738,125	United States.....	2,243	2,711	2,218	939,287
Pennsylvania.....	23,395	33,487	41,400	292,404	Connecticut.....	13	179	170	1,500
South Carolina.....	5,160	7,440	5,035	216,491	Illinois.....	148	70	40	107,955
Tennessee.....	2,470	5,374	1,820	169,775	Massachusetts.....	36	142	310	24,892
Texas.....	2,513	100	750	785,458	Michigan.....	201	120	118,490	
Virginia.....	13,720	19,366	12,941	1,519,096	New York.....	219	742	656	187,936
Wisconsin.....	24,726	23,466	36,323	410,967	Ohio.....	657	217	41	206,458
All other states.....	3,666	4,834	8,208		Pennsylvania.....	432	333	141	133,811
WAGONS (BUSINESS, FARM, GOVERNMENT, ETC.)					SLEIGHS AND SLEDS.				
United States.....	587,685	643,755	570,428	39,932,910	United States.....	100,899	127,455	117,008	2,065,850
Alabama.....	4,588	12,512	9,523	236,024	Illinois.....	2,517	5,007	1,880	43,014
Arkansas.....	7,415	1,625	1,149	436,663	Indiana.....	1,101	1,378	3,834	20,483
California.....	3,347	3,045	2,325	548,865	Iowa.....	8,094	2,766	4,020	130,108
Connecticut.....	1,786	1,944	1,427	220,237	Maine.....	2,169	2,802	2,315	77,398
Florida.....	1,578	2,652	1,602	116,511	Michigan.....	32,751	53,180	51,149	570,207
Georgia.....	15,708	18,848	11,443	5,615,199	Minnesota.....	10,954	10,003	7,530	185,059
Illinois.....	85,097	72,033	56,364	5,444,456	New York.....	10,823	19,433	14,500	349,643
Indiana.....	87,844	92,893	94,224	1,432,147	Ohio.....	7,589	8,479	3,555	78,542
Iowa.....	26,495	22,815	31,473	113,963	Pennsylvania.....	3,210	5,551	5,509	90,619
Kansas.....	1,166	1,004	995	167,599	Washington.....	1,033	501	956	4,620
Kentucky.....	25,911	49,266	39,362	1,745,448	Wisconsin.....	17,720	15,365	17,451	399,310
Louisiana.....	1,269	1,246	1,377	688,368	All other states.....	2,938	2,990	4,307	116,847
Maine.....	2,259	1,764	1,172						
Maryland.....	2,719	1,849	1,144						
Massachusetts.....	3,360	3,278	3,944						

Family and pleasure carriages were made in 44 of the 48 states of the Union in 1909. The five leading states in the manufacture of this class of vehicles, however, Indiana, Ohio, Illinois, Missouri, and Michigan, together reported 603,948 carriages, or 72.9 per cent of the total number for the United States. Of these five leading states, Illinois, Indiana, and Missouri show gains between 1899 and 1909 in the number made, while Michigan and Ohio show losses. Ohio was first in the number of these vehicles in 1899 and 1904, but was second in 1909, being outranked by Indiana. Of the 24 states for which the number of carriages is shown separately, 13 reported decreases in the number made in 1909 as compared with the number in 1899.

Wagons (business, farm, government, etc.) were made in 1909 in every state in which the carriage and wagon industry was conducted. The four leading states, Wisconsin, Indiana, Illinois, and Pennsylvania,

together reported the manufacture of 298,586 wagons, or 50.8 per cent of the total. Of the 31 states for which the numbers are given separately, 17 show an increase between 1899 and 1909 in the number made, and 14 a decrease. Illinois shows the greatest absolute increase and Michigan the largest decrease. Indiana, which was first in the number of wagons manufactured in 1899 and 1904, had in 1909 relinquished first place to Wisconsin, which state had held second place in this respect at the two preceding censuses. In value of vehicles of this class manufactured in 1909, Illinois ranked first, Indiana second, and Wisconsin third.

The most important states in the manufacture of public conveyances in 1909 were Ohio, Pennsylvania, New York, and Michigan.

While the manufacture of sleighs and sleds was reported in 33 states, 71.6 per cent of the total number were made in four states, Michigan, Wisconsin, Minnesota, and New York.

DETAILED STATISTICS, BY STATES.

The principal facts brought out by the census inquiry concerning the industry are presented by states in Tables 19 and 20.

Table 19 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in the

industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 20 gives the statistics of the industry for 1909 in somewhat greater detail.

CARRIAGES AND WAGONS AND MATERIALS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	5,492	82,944	6,213	6,803	69,928	126,032	\$175,474	\$7,960	\$37,595	\$81,951	\$159,893	\$77,042
	1904	5,588	90,751	6,575	6,294	77,832	108,159	152,346	6,581	38,363	77,528	155,869	78,341
	1899	6,792			5,026	73,812	83,771	128,862	4,759	33,565	66,772	138,262	71,490
Alabama.....	1909	35	508	40	44	424	991	752	45	194	303	684	381
	1904	26	439	30	29	380	554	581	29	165	377	740	363
	1899	47			29	461		436	19	140	252	600	348
Arkansas.....	1909	58	1,126	63	90	973	3,749	1,823	92	405	820	1,664	844
	1904	33	541	31	50	460	1,632	747	39	174	346	772	426
	1899	40			30	348		400	16	111	311	555	244
California.....	1909	155	1,015	185	70	760	957	1,635	74	610	849	2,052	1,203
	1904	198	1,277	248	49	980	782	1,730	51	715	852	2,352	1,500
	1899	193			37	923		1,603	44	502	776	1,976	1,200
Colorado.....	1909	21	158	25	9	124	125	160	8	87	85	260	175
	1904	35	225	39	9	177	84	263	9	130	133	379	246
	1899	40			11	174		293	11	120	139	385	246
Connecticut.....	1909	92	720	99	43	578	957	1,226	41	372	383	1,077	694
	1904	109	1,730	122	101	1,507	1,329	2,326	131	767	763	2,198	1,403
	1899	135			112	1,644		3,529	136	1,032	1,245	3,166	1,921
Delaware.....	1909	25	208	29	16	163	204	433	13	81	124	290	166
	1904	25	211	32	14	165	204	335	10	85	131	286	155
	1899	26			18	278		504	16	130	140	387	247
Distriot of Columbia.....	1909	6	75	10	6	59	27	134	4	40	47	128	81
	1904	6	59	6	1	52	57	50	2	25	22	75	53
	1899	5			1	42		42	1	19	17	54	37
Florida.....	1909	39	309	51	28	230	354	427	29	136	210	453	243
	1904	31	247	42	9	195	109	222	6	102	124	344	220
	1899	31			3	131		131	2	66	91	198	107
Georgia.....	1909	83	1,252	81	112	1,059	1,353	2,220	128	489	1,367	2,560	1,193
	1904	75	1,293	91	87	1,115	1,110	1,509	97	426	1,222	2,303	1,081
	1899	104			39	808		825	31	257	534	1,317	783
Illinois.....	1909	325	6,746	349	545	5,852	9,684	17,859	644	3,588	9,479	16,831	7,352
	1904	324	5,981	361	465	5,155	7,238	12,005	534	2,778	5,746	11,392	5,646
	1899	361			345	4,345		8,880	350	2,114	4,353	9,002	4,649
Indiana.....	1909	221	10,100	211	1,022	8,867	13,790	29,110	1,295	4,355	12,458	21,655	9,197
	1904	252	10,601	257	938	9,406	13,352	25,879	952	4,184	10,869	19,259	8,390
	1899	323			707	8,714		19,798	683	3,525	8,553	15,811	7,258
Iowa.....	1909	119	1,828	153	229	1,441	2,387	4,468	232	828	2,748	4,786	2,038
	1904	113	1,632	137	197	1,398	1,915	3,392	194	602	1,684	3,371	1,687
	1899	124			163	1,711		4,033	121	712	1,947	3,988	2,041
Kansas.....	1909	46	322	59	17	246	266	439	15	134	245	530	285
	1904	38	279	53	12	214	96	324	9	105	117	321	204
	1899	31			18	161		173	10	68	99	243	144
Kentucky.....	1909	161	3,263	171	315	2,777	6,617	7,759	322	1,164	2,713	5,141	2,428
	1904	131	3,119	133	252	2,734	4,971	5,309	252	1,104	2,814	5,505	2,691
	1899	160			164	2,247		3,734	169	809	1,922	3,664	1,742
Louisiana.....	1909	40	427	45	24	358	568	407	22	196	206	529	323
	1904	40	350	46	11	293	220	237	11	159	151	436	285
	1899	41			13	285		260	8	119	128	360	232
Maine.....	1909	150	667	168	27	472	1,121	1,004	24	257	397	966	569
	1904	158	659	186	14	459	790	692	11	247	400	956	556
	1899	151			17	344		612	11	175	278	720	442
Maryland.....	1909	126	960	154	49	757	879	1,192	45	372	541	1,330	789
	1904	119	1,158	160	52	946	985	1,219	37	415	698	1,485	787
	1899	116			33	769		777	25	294	385	991	606
Massachusetts.....	1909	177	1,857	205	113	1,539	2,038	2,824	109	986	1,232	3,185	1,903
	1904	305	3,040	369	141	2,530	2,807	4,494	133	1,541	2,030	4,922	2,892
	1899	349			154	3,271		5,966	131	1,703	2,803	6,289	3,486
Michigan.....	1909	212	4,707	240	433	4,034	6,362	10,189	532	2,240	5,262	10,159	4,897
	1904	218	7,231	233	598	6,400	8,411	11,302	583	3,053	8,440	14,889	6,449
	1899	271			450	6,111		8,916	399	2,514	7,550	12,837	5,337

¹ Excluding statistics for one establishment, to avoid disclosure of individual operations.

² Excluding statistics for two establishments, to avoid disclosure of individual operations.

CARRIAGES AND WAGONS AND MATERIALS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Contd.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.					Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).	Expressed in thousands.							
Minnesota.....	1909	134	1,108	164	86	368	1,657	\$2,331	\$102	\$529	\$953	\$2,175	\$1,192	
	1904	141	1,180	175	82	923	1,826	2,224	53	454	867	1,868	1,001	
	1899	181	.....	.....	54	1,167	.....	1,924	59	487	964	2,108	1,144
Mississippi.....	1909	41	454	50	39	365	1,350	649	41	154	274	642	368	
	1904	24	375	24	33	318	1,003	473	31	132	213	494	281	
	1899	30	.....	.....	9	228	211	183	7	88	131	302	171
Missouri.....	1909	243	3,940	277	361	3,302	6,858	7,883	459	1,781	4,860	8,469	3,609	
	1904	248	3,765	293	309	3,163	3,431	5,756	347	1,726	4,261	7,678	3,417	
	1899	378	.....	.....	222	2,989	.....	4,587	247	1,471	3,122	6,446	3,324
Montana.....	1909	4	34	2	4	28	19	68	5	32	29	79	50	
	1904	6	37	8	6	23	21	60	6	20	37	107	70	
	1899	17	.....	.....	4	30	.....	64	4	31	32	101	69
Nebraska.....	1909	22	247	23	24	200	224	459	20	131	251	577	326	
	1904	20	188	27	11	150	101	212	9	87	128	318	190	
	1899	29	197	62	11	124	.....	134	9	67	90	247	157
New Hampshire.....	1909	44	493	44	29	420	1,231	1,067	31	240	346	734	388	
	1904	48	603	53	29	521	1,253	1,141	31	297	291	784	493	
	1899	59	.....	.....	33	616	.....	1,261	31	320	349	906	557
New Jersey.....	1909	256	1,980	301	78	1,601	1,645	2,973	83	1,019	1,280	3,250	1,970	
	1904	213	2,338	247	105	1,986	1,631	2,998	116	1,116	1,349	3,460	2,111	
	1899	258	.....	.....	112	2,117	.....	3,250	109	1,061	1,612	3,916	2,304
New York.....	1909	610	7,333	693	524	6,116	10,029	14,576	731	3,740	5,809	13,293	7,484	
	1904	635	9,294	756	587	7,891	8,524	15,896	716	4,406	6,201	14,644	8,443	
	1899	784	.....	.....	505	7,490	.....	14,647	539	4,009	5,913	14,003	8,090
North Carolina.....	1909	138	1,922	160	133	1,629	9,110	3,168	150	603	1,894	3,283	1,389	
	1904	² 125	1,597	160	64	1,373	1,310	2,010	60	482	1,229	2,304	1,075	
	1899	² 157	.....	.....	29	800	.....	861	19	236	521	1,055	534
Ohio.....	1909	407	10,350	414	1,121	8,815	14,771	20,398	1,282	4,647	11,414	21,949	10,535	
	1904	456	12,555	495	1,033	11,027	16,936	19,295	1,069	5,269	12,856	24,003	11,147	
	1899	558	.....	.....	954	11,658	.....	17,235	842	5,020	12,181	22,803	10,622
Oklahoma.....	1909	19	158	22	13	123	319	172	12	72	81	233	152	
	1904	¹ 8	52	8	1	43	15	54	1	23	26	67	41	
	1899	¹ 7	.....	.....	.....	27	.....	24	.....	9	11	37	26
Oregon.....	1909	15	84	16	6	62	52	65	7	56	68	193	125	
	1904	17	84	17	4	63	100	102	1	42	54	135	81	
	1899	19	.....	.....	2	56	.....	70	(³)	35	43	113	70
Pennsylvania.....	1909	655	8,757	781	478	7,498	11,544	14,365	500	3,861	5,707	12,748	7,041	
	1904	656	8,689	825	403	7,461	9,197	12,368	397	3,647	4,902	11,493	6,591	
	1899	797	.....	.....	318	6,399	.....	10,684	296	3,070	4,246	10,455	6,209
Rhode Island.....	1909	40	296	39	19	238	387	408	15	152	163	422	259	
	1904	¹ 30	269	33	8	228	158	329	7	140	117	370	253	
	1899	52	.....	.....	12	294	.....	366	9	173	190	529	339
South Carolina.....	1909	23	317	25	20	272	272	453	25	104	244	464	220	
	1904	38	404	42	16	346	320	502	20	113	290	548	258	
	1899	56	.....	.....	14	340	.....	314	12	91	206	414	208
South Dakota.....	1909	10	64	10	6	48	94	133	4	38	60	131	71	
	1904	3	23	2	2	19	16	54	2	13	10	31	21	
	1899	9	.....	.....	.....	25	41	44	.....	14	20	49	29
Tennessee.....	1909	129	1,992	150	136	1,706	4,537	3,006	160	693	1,439	3,040	1,601	
	1904	97	2,148	109	150	1,889	4,408	2,617	153	759	1,668	3,278	1,610	
	1899	95	.....	.....	77	1,157	.....	1,138	71	395	779	1,692	913
Texas.....	1909	50	522	54	56	412	374	941	63	267	319	830	511	
	1904	² 34	261	41	9	211	118	286	9	124	130	368	238	
	1899	² 58	.....	.....	8	290	.....	386	7	159	180	506	326
Vermont.....	1909	38	140	45	1	94	429	222	(³)	50	58	158	100	
	1904	¹ 32	155	46	1	108	324	214	1	59	55	164	109	
	1899	¹ 57	.....	.....	3	186	.....	316	1	91	98	285	187
Virginia.....	1909	130	1,609	142	138	1,329	2,032	3,029	137	629	1,283	2,485	1,202	
	1904	102	1,540	121	87	1,332	1,735	2,078	75	473	1,196	2,292	1,096	
	1899	150	.....	.....	42	964	.....	1,373	37	371	694	1,586	892
Washington.....	1909	37	317	46	30	241	254	538	33	203	319	720	401	
	1904	¹ 25	249	36	12	201	130	230	11	158	188	482	294	
	1899	¹ 25	.....	.....	8	132	.....	98	9	89	110	283	173
West Virginia.....	1909	51	446	62	37	347	893	671	41	180	318	675	357	
	1904	38	383	43	29	311	1,117	493	30	155	300	639	339	
	1899	53	.....	.....	15	312	.....	437	13	133	210	490	280
Wisconsin.....	1909	286	4,044	338	269	3,437	6,426	13,706	382	1,930	5,163	8,899	3,736	
	1904	330	4,361	410	269	3,682	5,374	10,135	296	1,811	4,092	8,089	3,997	
	1899	381	.....	.....	228	3,477	.....	8,455	254	1,646	3,413	7,034	3,621
All other states.....	1909	19	89	22	3	64	96	132	3	51	70	164	94	
	1904	26	189	28	15	146	406	202	15	75	119	270	151	
	1899	45	.....	.....	22	167	.....	200	11	79	134	309	175

¹ Excluding statistics for one establishment, to avoid disclosure of individual operations.
² Excluding statistics for two establishments, to avoid disclosure of individual operations.
³ Less than \$500.

Table 20	STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.
			Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Average number.	Wage earners.		Total.	16 and over.		Under 16.				
						Male.	Female.		Number, 15th day of—			Male.	Female.	Male.	Female.			
									Maximum month.	Minimum month.								
1	United States	5,482	32,944	6,213	2,631	2,991	1,181	68,928	My 73,240	Ja 66,567	72,783	71,104	1,126	546	7	128,032		
2	Alabama	35	508	40	22	18	4	424	Oc 441	Au 402	431	421	.....	10	.....	991
3	Arkansas	58	1,126	63	55	28	7	973	Se 1,096	Ja 837	1,114	1,101	.....	13	.....	3,749
4	California	155	1,015	185	42	12	16	760	Je 821	Ja 677	741	733	.....	8	.....	957
5	Colorado	21	158	25	6	3	.....	124	Jy 142	Ja ¹ 108	108	108	.....	.....	.....	125
6	Connecticut	92	720	99	23	12	8	578	My 641	Ja 521	547	545	.....	2	.....	957
7	Delaware	25	208	29	9	5	2	163	My ¹ 178	De 146	146	144	.....	1	.....	204
8	District of Columbia	6	75	10	4	1	1	59	Se 71	Fe 47	52	52	.....	.....	.....	27
9	Florida	39	309	51	15	11	2	230	Je 243	De 214	238	230	.....	8	.....	354
10	Georgia	83	1,282	81	49	59	4	1,059	De 1,228	Ja 953	1,228	1,186	.....	4	.....	1,353
11	Illinois	325	6,746	349	188	260	97	5,852	My 6,099	Ja 5,345	6,094	5,975	.....	106	.....	9,684
12	Indiana	221	10,100	211	276	516	230	8,867	Mh 9,429	Oc 8,283	8,974	8,597	.....	272	.....	13,790
13	Iowa	119	1,828	158	65	120	44	1,441	Ap 1,589	No 1,293	1,349	1,326	.....	21	.....	2,857
14	Kansas	46	322	59	6	6	5	245	Je 268	De 218	223	221	.....	1	.....	266
15	Kentucky	161	3,263	171	128	142	45	2,777	Ap 2,913	No 2,642	2,868	2,747	.....	109	.....	6,617
16	Louisiana	40	427	45	14	8	2	358	De 379	Je 340	379	378	.....	1	.....	568
17	Maine	150	667	168	14	10	3	472	Fe ¹ 526	Au 388	507	507	.....	.....	.....	1,121
18	Maryland	126	960	154	31	12	6	757	Ap 796	No 712	748	739	.....	9	.....	879
19	Massachusetts	177	1,857	205	44	55	34	1,539	My 1,720	De 1,382	1,458	1,441	.....	15	.....	2,038
20	Michigan	212	4,707	240	121	209	103	4,034	Ap 4,347	Au 3,512	4,349	4,270	.....	75	.....	6,362
21	Minnesota	134	1,108	154	42	29	15	868	My 918	Ja 818	893	888	.....	5	.....	1,657
22	Mississippi	41	454	50	20	18	1	365	No 420	Mh 308	1,489	1,488	.....	.....	.....	1,350
23	Missouri	243	3,940	277	166	145	50	3,302	Ap 3,548	Ja 3,035	3,245	3,162	.....	71	.....	5,858
24	Montana	4	34	2	2	2	.....	28	Je 34	Fe 23	24	24	.....	.....	.....	19
25	Nebraska	22	247	23	6	11	7	200	Ap 221	Ja 178	187	186	.....	1	.....	224
26	New Hampshire	44	493	44	14	10	5	420	Ap 437	Au 400	437	435	.....	2	.....	1,231
27	New Jersey	256	1,980	301	37	32	9	1,601	Au 1,655	Ja 1,497	1,632	1,630	.....	1	.....	1,645
28	New York	610	7,333	693	192	277	75	6,116	My 6,384	Se 5,925	6,206	6,101	.....	105	.....	10,029
29	North Carolina	138	1,922	160	75	44	14	1,629	De 1,750	Ja 1,536	1,756	1,671	.....	8	.....	9,110
30	North Dakota	3	12	3	.....	.....	.....	9	Mh ¹ 10	Jy ¹ 8	10	10	.....	.....	.....	14
31	Ohio	407	10,350	414	437	447	237	8,815	My 9,596	Au 7,944	9,051	8,757	.....	241	.....	14,771
32	Oklahoma	19	158	22	8	4	1	123	Jy 134	Ja 114	121	121	.....	.....	.....	319
33	Oregon	15	84	16	4	2	.....	62	Jy 65	Fe 57	62	62	.....	.....	.....	52
34	Pennsylvania	655	8,757	781	193	226	59	7,498	Je 7,932	Ja 7,188	7,455	7,338	.....	33	.....	11,544
35	Rhode Island	40	296	39	10	2	7	238	Mh 262	Ja 214	220	217	.....	1	.....	357
36	South Carolina	23	317	25	9	8	3	272	De 291	Au 245	291	258	.....	5	.....	272
37	South Dakota	10	64	10	3	2	1	48	De 60	Fe 42	60	60	.....	.....	.....	94
38	Tennessee	129	1,992	150	82	38	16	1,706	No 1,833	Ja 1,555	1,892	1,875	.....	4	.....	4,537
39	Texas	50	522	54	20	35	1	412	Ap 441	Ja 382	398	390	.....	3	.....	374
40	Vermont	38	140	45	.....	.....	.....	94	Fe 98	Au 91	97	96	.....	.....	.....	429
41	Virginia	130	1,609	142	68	57	13	1,323	My 1,392	Ja 1,225	1,410	1,383	.....	7	.....	2,032
42	Washington	37	317	46	22	5	3	241	Au 285	Fe 209	223	223	.....	.....	.....	254
43	West Virginia	51	446	62	22	8	7	347	My 373	Au 331	362	357	.....	1	.....	893
44	Wisconsin	286	4,044	338	84	142	43	3,437	Oo 3,561	Ja 3,239	3,650	3,594	.....	32	.....	6,426
45	Wyoming	10	22	14	.....	.....	.....	8	Mh ¹ 9	Je ¹ 6	9	9	.....	.....	.....	10
46	All other states ²	6	55	5	3	.....	.....	47	.....	.....	49	48	.....	1	.....	72

¹ Same number reported for one or more other months.

DETAILED STATISTICS, BY STATES: 1909.

Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
	Total.	Services.			Materials.			Miscellaneous.				
		Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1 \$175,478,728	\$139,176,014	\$4,506,871	\$3,453,336	\$37,594,919	\$1,771,984	\$80,179,304	\$1,195,640	\$901,237	\$268,512	\$9,319,211	\$159,892,647	\$77,941,259
2 751,944	605,045	26,324	18,469	194,087	10,422	292,609	12,718	6,120	1,456	43,840	683,880	380,849
3 1,823,299	1,433,090	63,679	28,142	404,881	9,146	810,510	6,837	10,301	5,547	94,047	1,664,467	844,811
4 1,635,359	1,681,714	57,312	16,592	609,720	45,633	803,433	61,348	9,068	11,303	67,305	2,052,434	1,203,368
5 160,264	196,393	6,080	2,016	87,391	3,835	81,515	7,155	1,743	166	6,392	260,295	174,845
6 1,225,850	873,724	23,664	12,780	371,838	19,018	363,623	15,758	6,661	15,655	39,727	1,076,582	693,941
7 432,551	234,136	9,366	3,162	81,387	3,472	120,585	3,977	2,236	-----	9,951	290,113	166,056
8 133,720	95,120	2,882	1,084	40,331	42,924	46,079	1,820	523	-----	1,477	128,107	81,104
9 426,610	406,988	18,348	11,146	135,965	5,068	205,207	10,680	3,365	-----	17,209	452,599	242,324
10 2,219,901	2,162,620	75,734	51,867	489,036	21,366	1,346,037	21,960	16,705	30	139,886	2,660,031	1,192,629
11 17,858,786	14,810,098	343,145	300,393	3,588,016	182,268	9,297,067	105,562	85,148	4,865	903,634	16,831,283	7,351,948
12 29,110,185	19,437,036	695,411	599,627	4,354,584	207,322	12,250,401	23,548	103,075	10,007	1,193,061	21,655,440	9,197,717
13 4,463,233	4,123,887	111,875	120,089	827,785	42,272	2,705,239	24,671	31,988	15,116	244,852	4,786,321	2,038,810
14 438,815	447,561	6,900	7,884	133,863	5,496	239,338	5,605	4,319	375	43,781	530,483	285,649
15 7,759,088	4,627,296	189,725	132,592	1,163,685	55,815	2,656,691	16,238	42,008	4,474	366,262	5,141,107	2,428,601
16 407,273	450,727	15,100	6,806	196,281	8,225	197,793	6,012	1,505	-----	10,005	528,767	322,739
17 1,003,664	718,346	15,559	7,969	257,293	16,097	381,061	8,701	5,446	5,813	20,407	966,093	568,935
18 1,191,906	1,032,974	36,784	8,546	372,416	15,048	526,130	19,434	7,661	3,382	43,573	1,330,068	788,890
19 2,823,651	2,583,858	60,578	48,224	985,994	50,227	1,231,554	53,415	23,208	8,318	122,340	3,184,835	1,903,054
20 10,188,595	9,037,296	268,312	263,898	2,239,979	102,417	5,159,839	20,507	66,374	4,722	911,248	10,158,883	4,896,627
21 2,331,060	1,752,539	65,737	36,601	529,317	32,177	950,821	20,274	15,295	745	101,572	2,174,705	1,191,707
22 645,506	535,943	22,189	19,265	154,105	5,539	268,205	3,100	3,850	16,500	43,190	641,957	368,213
23 7,883,062	7,646,070	284,126	175,184	1,780,649	62,083	4,797,747	103,010	32,782	8,675	401,814	8,468,856	3,609,026
24 67,653	68,932	2,400	2,200	31,514	1,483	27,504	960	1,053	-----	1,818	78,669	49,682
25 459,187	427,495	6,819	13,660	130,589	6,345	244,825	4,322	2,253	300	18,382	576,918	325,748
26 1,066,747	665,258	19,960	11,364	239,898	13,359	332,211	6,597	6,900	925	34,044	733,755	388,135
27 2,973,362	2,573,416	57,394	25,110	1,018,617	43,053	1,236,706	44,966	16,778	3,321	127,471	3,250,456	1,970,697
28 14,576,400	11,359,828	376,948	354,079	3,739,940	172,032	5,636,686	239,547	72,991	38,688	728,917	13,292,531	7,483,813
29 3,168,231	2,830,604	100,358	49,358	602,527	27,384	1,866,122	10,521	22,990	4,298	147,046	3,282,634	1,389,128
30 23,685	15,165	-----	-----	6,940	787	6,700	-----	168	-----	670	18,885	11,398
31 20,397,675	19,320,042	726,241	555,688	4,647,200	211,381	11,202,620	125,421	119,657	22,129	1,709,705	21,949,459	10,535,458
32 172,487	184,715	10,000	2,410	72,481	3,382	77,492	6,340	1,542	10	11,058	232,880	152,006
33 64,965	146,059	6,000	1,200	55,473	3,851	64,398	11,050	354	-----	3,733	192,659	124,410
34 14,364,549	10,889,903	283,212	217,105	3,861,336	181,008	5,526,017	88,121	53,045	14,957	665,102	12,748,383	7,041,358
35 408,410	347,504	10,546	4,386	151,721	7,672	155,495	4,222	2,416	475	10,571	421,913	258,746
36 453,150	412,481	12,595	12,428	104,025	4,026	240,354	3,076	3,112	-----	32,865	463,566	219,186
37 133,121	108,348	2,900	1,380	37,952	3,824	56,499	70	1,215	13	4,495	131,384	71,061
38 3,005,864	2,541,308	114,980	44,563	693,307	22,549	1,416,877	22,021	15,893	40,313	170,805	3,039,613	1,600,187
39 940,529	700,069	36,496	26,829	267,071	12,415	306,768	14,855	5,211	70	30,354	829,726	510,543
40 222,257	114,605	-----	312	50,097	3,654	54,067	921	1,468	742	3,344	158,200	100,479
41 3,028,729	2,145,699	90,153	46,620	529,313	23,176	1,260,104	15,951	15,838	7,564	156,980	2,485,221	1,201,941
42 538,026	596,646	28,118	4,564	202,601	14,844	304,297	20,868	3,582	531	17,241	720,054	400,913
43 670,757	568,719	30,010	10,594	180,099	7,113	310,971	8,869	3,234	-----	17,829	675,478	357,394
44 13,706,422	8,147,998	184,431	197,150	1,929,904	101,389	5,061,210	11,852	72,248	2,027	587,787	8,899,171	3,736,572
45 32,740	31,239	-----	-----	7,978	577	21,838	360	201	-----	285	41,624	18,209
46 76,460	87,326	3,480	-----	35,733	2,711	38,059	2,400	707	-----	4,236	102,072	61,302

* All other states embrace: Arizona, 1 establishment; Idaho, 1; New Mexico, 2; Utah, 2.

CLAY PRODUCTS INDUSTRIES

(847)

THE CLAY PRODUCTS INDUSTRIES.

GENERAL STATISTICS.

Scope of the classification.—The present report covers two distinct industries: (1) The brick and tile industry, the chief products of which are building brick, fancy and ornamental brick, vitrified paving brick, draitile, and sewer pipe; and (2) the pottery, terra-cotta, and fire-clay products industry, the chief products of which are stoneware, earthenware, porcelain ware, and china of various kinds, sanitary ware, fire brick, and terra-cotta products.

Summary for the two industries combined: 1909.—Table 1 presents a summary of the statistics of the two clay products industries combined, together with figures for the separate industries, for 1909.

	CLAY PRODUCTS INDUSTRIES.		
	Total for the two industries combined.	Brick and tile industry.	Pottery, terra-cotta, and fire-clay products industry.
Number of establishments.....	5,037	4,215	822
Persons engaged in the industry.....	146,786	85,764	61,022
Proprietors and firm members.....	4,737	4,285	452
Salaried employees.....	9,353	4,951	4,402
Wage earners (average number).....	132,696	76,528	56,168
Primary horsepower.....	451,186	341,169	110,017
Capital.....	\$316,022,470	\$174,672,805	\$141,349,665
Expenses.....	141,399,997	75,744,418	65,655,579
Services.....	78,144,116	42,577,391	35,566,725
Salaries.....	11,252,037	5,438,807	5,813,230
Wages.....	66,892,079	37,138,584	29,753,495
Materials.....	45,647,007	23,736,102	21,910,905
Miscellaneous.....	17,608,874	9,430,925	8,177,949
Value of products.....	168,895,365	92,776,504	76,118,861
Value added by manufacture (value of products less cost of materials).....	123,248,358	69,040,402	54,207,956

The 5,037 establishments in the two industries combined in 1909 gave employment to an average of 146,786 persons, of whom 132,696 were wage earners, and paid out \$78,144,116 in salaries and wages. The total cost of materials used in these industries was exceptionally low, equaling in 1909 only 27 per cent of the total value of products, whereas in the case of all industries of the country combined the proportion was 58.7 per cent. This is due to the fact that the clay used is almost invariably taken from the ground by the employees of the establishments in the industry, and the cost, therefore, is reported as wages. This explains the relatively large wage payments reported; such payments equaled 39.6 per cent of the value of products, as compared with 16.6 per cent for all industries combined.

Of the 5,037 establishments canvassed for 1909, more than four-fifths (83.7 per cent) were engaged primarily in the manufacture of brick and tile; these establishments contributed products valued at \$92,776,504, or 54.9 per cent of the total value of products of the two industries combined.

Comparison with earlier censuses.—Table 2 summarizes the statistics for the two clay products industries for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

	CLAY PRODUCTS INDUSTRIES.											
	Number or amount.						Per cent of increase. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	5,037	5,507	6,423	6,535	6,383	3,959	-21.6	-8.5	-14.3	-1.7	2.4	61.2
Persons engaged in the industry.....	146,786	131,735	118,492	(?)	(?)	(?)	23.9	11.4	11.2	.....	.....	.....
Proprietors and firm members.....	4,737	5,845	7,596	(?)	(?)	(?)	-37.6	-19.0	-23.1	.....	.....	.....
Salaried employees.....	9,353	7,442	5,203	(?)	(?)	(?)	79.8	25.7	43.0	.....	.....	.....
Wage earners (average number).....	132,696	118,449	105,693	123,156	76,576	50,167	25.5	12.0	12.1	(?)	(?)	(?)
Primary horsepower.....	451,186	360,280	252,502	131,821	(?)	12,708	78.7	25.2	42.7	91.5	.....	.....
Capital.....	\$316,022,470	\$230,832,977	\$148,038,323	\$108,705,670	\$35,039,939	\$26,776,011	113.5	36.9	56.0	36.2	210.2	30.9
Expenses.....	141,399,997	109,515,058	74,377,689	68,203,106	(?)	(?)	90.1	29.1	47.2	9.1	.....	.....
Services.....	78,144,116	61,981,833	44,611,265	42,833,332	17,044,259	13,332,547	75.2	26.1	38.9	4.2	151.3	27.8
Salaries.....	11,252,037	8,158,213	5,036,195	(?)	(?)	(?)	123.4	37.9	62.0	.....	.....	.....
Wages.....	66,892,079	53,823,670	39,575,070	(?)	(?)	(?)	69.0	24.3	36.0	.....	.....	.....
Materials.....	45,647,007	32,907,961	22,921,384	18,257,998	12,683,897	9,531,162	99.1	35.7	43.6	25.5	43.9	33.1
Miscellaneous.....	17,608,874	14,625,214	6,845,040	7,111,776	(?)	(?)	157.3	20.4	113.7	-3.8	.....	.....
Value of products.....	168,895,365	135,352,854	95,533,862	89,827,785	41,810,920	36,368,151	76.8	24.8	41.7	6.4	114.8	15.0
Value added by manufacture (value of products less cost of materials).....	123,248,358	102,444,893	72,612,478	71,569,787	29,127,023	26,836,989	69.7	20.3	41.1	1.5	145.7	8.5

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.

² Comparable figures not available.

³ Figures not strictly comparable.

The statistics for the clay products industries were first reported at the census of 1849, when there were 2,121 establishments, employing 19,801 wage earners, and having products for the year valued at \$8,189,359. At the census of 1859, 2,240 establishments were reported, with 24,569 wage earners, and with products valued at \$13,987,828.

Substantial increases in value of products were reported at each census from 1869 to 1909. The value of products in 1909 was more than four and one-half times the value in 1869. From 1899 to 1909 the growth of the industries was particularly rapid, the average number of wage earners increasing 25.5 per cent, and the value of products 76.8 per cent.

BRICK AND TILE INDUSTRY.

Comparison with earlier censuses.—Table 3 summarizes the statistics of the brick and tile industry for each census from 1849 to 1909, inclusive.

The value of products in 1909 was more than fourteen times as great as that in 1849. There was an increase in the cost of materials, value of products, and value added by manufacture for each census period covered by the table, except for the decade 1889–1899 when there was a decrease. The year 1889 was one of unusual activity in this line of manufacture and was followed by a depression from which the industry had not fully recovered in 1899.

Summary, by states.—Table 4 summarizes the more important statistics for the brick and tile industry, by states, the states being arranged according to value of products reported for 1909. Some of the states for which data can not be shown separately ranked higher than some named in the table.

Table 3 BRICK AND TILE INDUSTRY.

CENSUS.	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	4, 215	76, 528	\$37, 138, 584	\$23, 736, 102	\$92, 776, 504	\$69, 040, 402
1904.....	4, 634	66, 021	28, 646, 005	16, 316, 499	71, 152, 062	54, 835, 563
1899.....	5, 423	61, 979	21, 883, 333	11, 006, 148	51, 270, 476	40, 284, 328
1894.....	5, 828	104, 176	29, 709, 357	12, 639, 597	67, 770, 695	55, 131, 098
1879.....	5, 631	66, 355	13, 443, 532	9, 774, 834	32, 833, 587	23, 058, 753
1869.....	3, 182	44, 051	11, 085, 374	7, 828, 457	30, 322, 615	22, 494, 158
1859.....	1, 651	20, 941	4, 054, 254	2, 132, 224	10, 769, 747	8, 637, 523
1849.....	1, 603	17, 345	4, 235, 088	1, 474, 023	6, 610, 731	5, 136, 708

Table 4 BRICK AND TILE INDUSTRY.

STATE.	Number of establishments: 1909	Wage earners.				Value of products.				Value added by manufacture.				Per cent of increase. ¹									
		Average number: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.		Wage earners (average number).			Value of products.			Value added by manufacture.			
				1909	1904			1909	1904			1909	1904	1909	1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
United States.	4, 215	76, 528	100.0	.....	.....	\$92, 776, 504	100.0	.....	.....	\$69, 040, 402	100.0	.....	.....	23.5	16.8	6.5	81.0	30.4	38.8	71.5	25.9	36.2
Illinois.....	340	6, 574	8.6	4	4	9, 765, 051	10.5	1	1	7, 273, 693	10.5	1	2	25.8	20.3	4.6	92.2	29.4	48.5	79.4	24.5	44.0	
Ohio.....	517	7, 466	9.8	3	3	9, 357, 730	10.1	2	4	7, 153, 387	10.4	2	4	39.5	11.1	25.5	102.1	31.1	54.1	96.1	30.0	50.8	
Pennsylvania.....	326	8, 058	10.5	2	1	9, 225, 204	9.9	3	3	6, 772, 165	9.8	3	3	19.7	6.6	12.3	54.9	26.7	22.3	40.6	19.2	18.0	
New York.....	205	8, 080	10.6	1	2	8, 432, 304	9.1	4	2	6, 715, 524	9.7	4	1	19.9	19.9	.....	48.4	13.5	30.7	46.8	10.8	32.5
Indiana.....	311	3, 788	4.9	6	5	4, 718, 923	5.1	5	5	3, 413, 336	4.9	5	6	5.0	13.6	-7.6	61.0	23.6	30.3	43.5	20.3	19.2	
Iowa.....	235	3, 158	4.1	7	6	4, 482, 767	4.8	6	6	3, 278, 327	4.7	6	6	69.0	19.9	32.6	126.9	33.3	70.1	116.3	29.9	66.5	
New Jersey.....	76	3, 405	4.4	6	9	4, 073, 286	4.4	7	11	3, 229, 523	4.7	7	9	43.7	74.9	-17.8	120.6	122.6	-0.9	111.6	116.3	-2.2	
Missouri.....	120	2, 999	3.9	8	7	3, 676, 274	4.0	8	7	2, 663, 953	3.9	8	7	22.9	28.3	-4.2	84.9	41.4	30.7	75.7	38.0	27.3	
California.....	78	1, 703	2.2	13	15	2, 756, 308	3.0	9	8	1, 804, 489	2.6	11	8	136.5	25.5	88.5	230.5	43.8	129.7	170.1	14.1	136.7	
Washington.....	58	1, 300	1.7	18	31	2, 558, 828	2.8	10	30	1, 907, 423	2.8	9	30	295.1	153.9	55.6	499.3	279.1	58.1	451.4	262.7	52.0	
Texas.....	89	1, 935	2.5	10	16	2, 544, 702	2.7	11	15	1, 778, 669	2.6	12	15	22.6	47.9	-17.2	149.5	95.0	27.9	126.3	89.5	19.5	
Kansas.....	55	1, 819	2.4	12	10	2, 336, 438	2.5	12	9	1, 805, 633	2.6	10	10	101.0	1.1	98.9	222.7	22.5	163.4	217.8	23.4	157.6	
Michigan.....	124	1, 565	2.0	14	14	2, 047, 211	2.2	13	13	1, 471, 971	2.1	13	13	8.5	9.0	-0.5	80.2	24.0	45.3	64.1	20.1	36.7	
Virginia.....	86	2, 090	2.7	9	8	1, 922, 476	2.1	14	12	1, 412, 092	2.0	14	11	47.4	6.4	38.5	91.1	6.5	79.3	74.1	2.7	69.6	
Georgia.....	75	1, 901	2.5	11	13	1, 711, 096	1.8	15	14	1, 176, 983	1.7	15	14	11.8	31.5	-15.0	62.5	28.0	27.0	49.2	21.1	23.2	
Colorado.....	69	922	1.2	26	32	1, 670, 042	1.8	16	26	1, 158, 639	1.7	17	25	110.5	86.3	13.0	236.0	104.4	64.4	182.0	77.8	58.6	
Minnesota.....	82	1, 038	1.4	22	24	1, 442, 149	1.6	18	16	1, 063, 873	1.6	18	16	22.3	4.5	17.0	86.8	17.5	58.9	81.3	13.8	59.6	
Tennessee.....	91	1, 281	1.7	19	17	1, 307, 826	1.4	19	19	982, 297	1.4	19	21	11.2	3.8	7.1	90.9	18.9	60.6	85.4	15.2	60.9	
Massachusetts.....	52	991	1.3	24	19	1, 243, 245	1.3	20	17	913, 347	1.3	20	20	-30.7	-9.7	-23.2	-15.3	6.1	-20.2	-14.6	8.6	-21.3	
Wisconsin.....	108	1, 027	1.3	23	11	1, 191, 379	1.3	21	10	909, 657	1.3	21	12	-30.1	-37.3	11.5	-33.7	-35.6	2.9	-14.7	-29.8	21.5	
North Carolina.....	159	1, 460	1.9	15	20	1, 173, 751	1.3	22	29	806, 061	1.2	24	29	3.7	35.3	-23.4	83.2	68.7	8.6	63.2	52.7	8.9	
Nebraska.....	78	831	1.1	29	25	1, 161, 106	1.3	23	18	883, 092	1.3	22	19	-2.8	-8.2	5.8	38.2	2.6	34.8	38.6	3.3	34.2	
Alabama.....	71	1, 353	1.8	16	21	1, 135, 134	1.2	24	25	847, 145	1.2	23	26	20.6	29.6	-7.0	72.5	34.0	28.7	64.5	31.7	24.9	
Oklahoma.....	38	730	1.0	30	34	1, 028, 693	1.1	25	33	802, 652	1.2	25	32	234.9	82.0	83.9	456.2	101.8	175.7	421.4	110.2	148.1	
Kentucky.....	82	1, 125	1.5	21	18	1, 015, 447	1.1	26	23	781, 467	1.1	26	23	22.6	1.0	21.4	60.9	14.4	40.6	55.3	9.8	41.4	
Maryland.....	40	1, 226	1.6	20	12	970, 625	1.0	27	20	721, 139	1.0	27	18	-18.3	-18.3	-2.5	15.0	-11.6	30.0	4.8	-17.1	26.5	
West Virginia.....	34	882	1.2	28	28	950, 364	1.0	28	24	675, 073	1.0	28	24	60.4	15.8	38.7	117.9	9.2	99.6	99.1	2.3	94.7	
Mississippi.....	73	939	1.2	25	28	794, 145	0.9	29	28	690, 101	0.9	29	27	3.4	4.0	-0.9	52.1	1.4	50.0	39.5	-2.6	43.3	
South Carolina.....	45	888	1.2	27	27	730, 543	0.8	30	31	462, 540	0.7	32	31	-22.4	1.5	-23.8	27.4	11.4	14.3	4.8	-3.3	8.4	
Utah.....	34	514	0.7	33	36	683, 087	0.7	31	35	547, 687	0.8	30	35	106.4	76.6	18.9	265.2	97.4	85.0	255.2	96.8	80.6	
Oregon.....	61	385	0.5	36	37	674, 520	0.7	32	36	519, 373	0.8	31	36	75.0	45.8	20.0	197.4	114.3	38.8	173.7	106.3	32.6	
Arkansas.....	42	685	0.8	31	30	601, 034	0.6	33	27	432, 953	0.6	33	28	28	45.5	11.4	30.8	117.0	-24.1	185.9	92.4	-27.2	164.4
New Hampshire.....	29	395	0.5	35	29	533, 045	0.6	34	32	378, 777	0.5	35	33	-33.2	-25.0	-10.8	-0.9	0.8	-1.7	-3.6	-0.3	-3.3	
All other states.....	332	4, 115	5.4	.....	.....	4, 861, 271	5.2	.....	.....	3, 729, 461	5.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 16. A minus sign (-) denotes decrease.

The brick and tile industry is widely distributed throughout the United States, establishments being reported from every state. Illinois ranked first at the censuses of 1909 and 1904 in value of products, and first and second, respectively, in value added by manufacture, and fourth at both censuses in average number of wage earners. Ohio ranked second in 1909 in value of products and value added by manufacture, advancing from fourth place in both respects in 1904. Pennsylvania ranked third in 1909 and 1904 both in value of products and value added by manufacture, and second in average number of wage earners, dropping from first place in this respect since 1904. According to value of products, New York ranked fourth in 1909, dropping from second place, which it held in 1904, but this state ranked first in average number of wage earners, advancing from second place during the five-year period.

Of the seven leading states in the brick and tile industry in 1909, Iowa shows the largest relative increase in number of wage earners, value of products, and value added by manufacture during the decade 1899-1909.

A few of the less important states advanced notably in rank in the industry, as measured by value of products, from 1904 to 1909—Washington, from thirtieth to tenth; Texas, from fifteenth to eleventh; Colorado, from twenty-sixth to sixteenth; North Carolina, from twenty-ninth to twenty-second; and Oklahoma, from thirty-third to twenty-fifth. Kansas dropped from ninth place in 1904 to twelfth in 1909; Massachusetts, from seventeenth to twentieth; Wisconsin, from tenth to twenty-first; and Maryland, from twentieth to twenty-seventh.

Most of the states held the same, or practically the same, rank in respect to value of products in 1909 as in respect to value added by manufacture.

Persons engaged in the industry.—Table 5 shows, for 1909, the number of persons engaged in the brick and tile industry, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

Table 5

CLASS.	PERSONS ENGAGED IN THE BRICK AND TILE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	85,764	85,234	530
Proprietors and officials.....	7,503	7,363	150
Proprietors and firm members.....	4,285	4,149	136
Salaried officers of corporations.....	1,118	1,107	11
Superintendents and managers.....	2,100	2,097	3
Clerks.....	1,733	1,434	299
Wage earners (average number).....	76,528	76,447	81
16 years of age and over.....	75,258	75,178	80
Under 16 years of age.....	1,270	1,269	1

The average number of persons engaged in the brick and tile industry during 1909 was 85,764, of whom 76,528, or 89.2 per cent, were wage earners; 7,503, or 8.7 per cent, proprietors and officials; and 1,733, or 2 per cent, clerks, this class including other subordinate salaried employees.

Of the total number of persons engaged in the industry, 85,234, or 99.4 per cent, were males, and 530, or six-tenths of 1 per cent, females. The average number of children under 16 years of age employed as wage earners was 1,270, or 1.7 per cent of the total number of wage earners.

The average number of wage earners in each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 16. The distribution of the average number by sex and age is not shown for the individual states, but Table 17 gives such a distribution of the number employed on December 15, or the nearest representative day.

In order to compare the distribution of the persons engaged in the brick and tile industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 6.

Table 6

CLASS.	PERSONS ENGAGED IN THE BRICK AND TILE INDUSTRY.				Per cent of increase: ¹ 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	85,764	100.0	75,006	100.0	14.3
Proprietors and firm members.....	4,285	5.0	5,295	7.1	-19.1
Salaried employees.....	4,951	5.8	3,690	4.9	34.2
Wage earners (average number).....	76,528	89.2	66,021	88.0	15.9

¹ A minus sign (-) denotes decrease.

Wage earners represented about nine-tenths of the total number of persons engaged in the industry at both censuses, but their number increased only 15.9 per cent between 1904 and 1909, as compared with 34.2 per cent for salaried employees. The number of proprietors and firm members shows a decrease of 19.1 per cent for the five-year period.

Table 7 shows the average number of wage earners in the industry distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

Table 7

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE BRICK AND TILE INDUSTRY.					
	1909		1904		1899	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
Total.....	76,528	100.0	66,021	100.0	61,979	100.0
16 years of age and over..	75,258	98.3	64,648	97.9	60,032	96.9
Male.....	75,178	98.2	64,612	97.9	59,956	96.7
Female.....	80	0.1	36	(¹)	76	0.1
Under 16 years of age.....	1,270	1.7	1,373	2.1	1,947	3.1

¹ Less than one-tenth of 1 per cent.

There was a constant decrease from census to census, both in the number and in the proportion of children employed, with a slight increase in the proportion represented by males 16 years of age and over. At each census the number of women employed was insignificant.

Wage earners employed, by months.—Table 8 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for each state in which an average of 500 or more wage earners were employed in 1909.

Table 8 WAGE EARNERS EMPLOYED IN THE BRICK AND TILE INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States.....	76,528	38,312	38,703	51,318	77,878	96,992	103,017	104,930	102,001	98,704	84,514	68,853	55,300
Alabama.....	1,353	<i>927</i>	<i>808</i>	<i>1,122</i>	<i>1,447</i>	<i>1,404</i>	<i>1,564</i>	<i>1,609</i>	<i>1,633</i>	<i>1,868</i>	<i>1,452</i>	<i>1,355</i>	<i>1,222</i>
Arkansas.....	585	<i>284</i>	<i>302</i>	<i>463</i>	<i>691</i>	<i>682</i>	<i>730</i>	<i>790</i>	<i>765</i>	<i>747</i>	<i>612</i>	<i>498</i>	<i>455</i>
California.....	1,703	<i>993</i>	<i>941</i>	<i>1,411</i>	<i>1,677</i>	<i>1,918</i>	<i>2,157</i>	<i>2,223</i>	<i>2,191</i>	<i>2,109</i>	<i>1,854</i>	<i>1,561</i>	<i>1,405</i>
Colorado.....	922	<i>676</i>	<i>629</i>	<i>697</i>	<i>798</i>	<i>1,112</i>	<i>1,248</i>	<i>1,308</i>	<i>1,222</i>	<i>1,193</i>	<i>888</i>	<i>710</i>	<i>679</i>
Connecticut and Rhode Island.....	1,312	<i>253</i>	<i>277</i>	<i>453</i>	<i>1,453</i>	<i>2,007</i>	<i>2,054</i>	<i>2,065</i>	<i>1,971</i>	<i>1,860</i>	<i>1,717</i>	<i>962</i>	<i>673</i>
Georgia.....	1,901	<i>1,337</i>	<i>1,385</i>	<i>1,770</i>	<i>2,125</i>	<i>2,196</i>	<i>2,198</i>	<i>2,130</i>	<i>2,163</i>	<i>2,110</i>	<i>1,971</i>	<i>1,836</i>	<i>1,593</i>
Illinois.....	6,574	<i>3,785</i>	<i>3,825</i>	<i>4,882</i>	<i>7,521</i>	<i>8,097</i>	<i>8,302</i>	<i>8,294</i>	<i>8,140</i>	<i>7,526</i>	<i>5,542</i>	<i>4,844</i>	<i>4,844</i>
Indiana.....	3,788	<i>2,173</i>	<i>2,307</i>	<i>2,848</i>	<i>3,940</i>	<i>4,644</i>	<i>4,703</i>	<i>4,673</i>	<i>4,621</i>	<i>4,560</i>	<i>4,195</i>	<i>3,558</i>	<i>3,234</i>
Iowa.....	3,158	<i>1,594</i>	<i>1,618</i>	<i>2,356</i>	<i>3,375</i>	<i>3,924</i>	<i>4,093</i>	<i>4,022</i>	<i>3,993</i>	<i>3,971</i>	<i>3,634</i>	<i>3,020</i>	<i>2,294</i>
Kansas.....	1,819	<i>1,143</i>	<i>1,199</i>	<i>1,689</i>	<i>1,908</i>	<i>2,016</i>	<i>2,175</i>	<i>2,135</i>	<i>2,080</i>	<i>2,039</i>	<i>1,940</i>	<i>1,815</i>	<i>1,689</i>
Kentucky.....	1,125	<i>366</i>	<i>359</i>	<i>623</i>	<i>1,196</i>	<i>1,528</i>	<i>1,609</i>	<i>1,665</i>	<i>1,661</i>	<i>1,622</i>	<i>1,397</i>	<i>881</i>	<i>579</i>
Louisiana.....	583	<i>247</i>	<i>314</i>	<i>493</i>	<i>696</i>	<i>736</i>	<i>791</i>	<i>681</i>	<i>705</i>	<i>645</i>	<i>547</i>	<i>411</i>	<i>411</i>
Maryland.....	1,226	<i>742</i>	<i>748</i>	<i>850</i>	<i>1,192</i>	<i>1,454</i>	<i>1,501</i>	<i>1,693</i>	<i>1,601</i>	<i>1,493</i>	<i>1,354</i>	<i>1,087</i>	<i>991</i>
Massachusetts.....	991	<i>164</i>	<i>160</i>	<i>211</i>	<i>576</i>	<i>1,632</i>	<i>1,784</i>	<i>1,808</i>	<i>1,806</i>	<i>1,611</i>	<i>1,098</i>	<i>630</i>	<i>417</i>
Michigan.....	1,565	<i>631</i>	<i>586</i>	<i>724</i>	<i>1,220</i>	<i>1,972</i>	<i>2,362</i>	<i>2,467</i>	<i>2,378</i>	<i>2,256</i>	<i>1,853</i>	<i>1,251</i>	<i>1,076</i>
Minnesota.....	1,038	<i>246</i>	<i>246</i>	<i>286</i>	<i>661</i>	<i>1,593</i>	<i>1,980</i>	<i>2,014</i>	<i>1,775</i>	<i>1,450</i>	<i>1,082</i>	<i>701</i>	<i>414</i>
Mississippi.....	939	<i>464</i>	<i>445</i>	<i>837</i>	<i>1,103</i>	<i>1,234</i>	<i>1,184</i>	<i>1,214</i>	<i>1,200</i>	<i>1,169</i>	<i>996</i>	<i>840</i>	<i>587</i>
Missouri.....	2,999	<i>1,605</i>	<i>1,635</i>	<i>2,524</i>	<i>3,281</i>	<i>3,503</i>	<i>3,576</i>	<i>3,899</i>	<i>3,550</i>	<i>3,611</i>	<i>3,299</i>	<i>2,921</i>	<i>2,496</i>
Nebraska.....	831	<i>220</i>	<i>245</i>	<i>507</i>	<i>924</i>	<i>1,187</i>	<i>1,232</i>	<i>1,188</i>	<i>1,263</i>	<i>1,186</i>	<i>992</i>	<i>648</i>	<i>384</i>
New Jersey.....	3,405	<i>1,529</i>	<i>1,568</i>	<i>2,113</i>	<i>3,725</i>	<i>4,445</i>	<i>4,515</i>	<i>4,514</i>	<i>4,621</i>	<i>4,565</i>	<i>4,024</i>	<i>3,071</i>	<i>2,171</i>
New York.....	8,080	<i>1,630</i>	<i>1,431</i>	<i>2,487</i>	<i>7,765</i>	<i>12,595</i>	<i>13,618</i>	<i>13,787</i>	<i>13,118</i>	<i>12,437</i>	<i>9,022</i>	<i>5,513</i>	<i>3,649</i>
North Carolina.....	1,460	<i>406</i>	<i>470</i>	<i>781</i>	<i>1,542</i>	<i>1,810</i>	<i>2,090</i>	<i>2,260</i>	<i>2,261</i>	<i>2,195</i>	<i>1,649</i>	<i>1,176</i>	<i>860</i>
Ohio.....	7,463	<i>4,878</i>	<i>4,928</i>	<i>5,665</i>	<i>7,460</i>	<i>8,986</i>	<i>9,401</i>	<i>9,372</i>	<i>8,980</i>	<i>8,946</i>	<i>8,070</i>	<i>6,772</i>	<i>6,134</i>
Oklahoma.....	730	<i>369</i>	<i>449</i>	<i>594</i>	<i>722</i>	<i>795</i>	<i>878</i>	<i>932</i>	<i>833</i>	<i>815</i>	<i>797</i>	<i>789</i>	<i>784</i>
Pennsylvania.....	8,058	<i>4,751</i>	<i>4,658</i>	<i>6,004</i>	<i>8,190</i>	<i>9,219</i>	<i>9,702</i>	<i>9,927</i>	<i>9,899</i>	<i>9,853</i>	<i>9,066</i>	<i>8,117</i>	<i>7,310</i>
South Carolina.....	888	<i>510</i>	<i>510</i>	<i>640</i>	<i>957</i>	<i>997</i>	<i>1,049</i>	<i>1,134</i>	<i>1,230</i>	<i>1,139</i>	<i>993</i>	<i>817</i>	<i>683</i>
Tennessee.....	1,281	<i>689</i>	<i>652</i>	<i>879</i>	<i>1,379</i>	<i>1,580</i>	<i>1,614</i>	<i>1,740</i>	<i>1,708</i>	<i>1,735</i>	<i>1,382</i>	<i>1,087</i>	<i>929</i>
Texas.....	1,935	<i>1,467</i>	<i>1,522</i>	<i>1,794</i>	<i>1,988</i>	<i>2,094</i>	<i>2,122</i>	<i>2,303</i>	<i>2,299</i>	<i>2,058</i>	<i>2,051</i>	<i>1,838</i>	<i>1,674</i>
Utah.....	514	<i>267</i>	<i>275</i>	<i>417</i>	<i>545</i>	<i>644</i>	<i>766</i>	<i>720</i>	<i>672</i>	<i>623</i>	<i>479</i>	<i>446</i>	<i>318</i>
Virginia.....	2,090	<i>1,317</i>	<i>1,401</i>	<i>1,596</i>	<i>2,179</i>	<i>2,549</i>	<i>2,515</i>	<i>2,603</i>	<i>2,841</i>	<i>2,568</i>	<i>2,222</i>	<i>1,872</i>	<i>1,604</i>
Washington.....	1,300	<i>854</i>	<i>978</i>	<i>1,109</i>	<i>1,392</i>	<i>1,540</i>	<i>1,890</i>	<i>1,643</i>	<i>1,538</i>	<i>1,490</i>	<i>1,233</i>	<i>1,085</i>	<i>1,042</i>
West Virginia.....	882	<i>397</i>	<i>386</i>	<i>710</i>	<i>1,023</i>	<i>1,179</i>	<i>1,086</i>	<i>1,046</i>	<i>1,121</i>	<i>989</i>	<i>920</i>	<i>665</i>	<i>665</i>
Wisconsin.....	1,027	<i>299</i>	<i>280</i>	<i>352</i>	<i>644</i>	<i>1,575</i>	<i>1,814</i>	<i>1,893</i>	<i>1,801</i>	<i>1,817</i>	<i>1,011</i>	<i>651</i>	<i>384</i>

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The industry is largely a seasonal one. The largest number of wage earners reported for any month of 1909 was 104,930, in July, and the smallest number, 38,312, in January, the minimum number being equal to 36.5 per cent of the maximum. The greatest activity in the industry is naturally in the summer months, since the manufacture of brick and tile is largely outdoor work. In 1904 the maximum number, 99,024, was reported for July, and the minimum number, 25,754, equal to 26 per cent of the maximum, for January.

Prevailing hours of labor.—In Table 9 the wage earners in the brick and tile industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Over two-thirds (69.4 per cent) of the wage earners employed in the manufacture of brick and tile in 1909 were in establishments where the prevailing number of hours was 60 or more per week, 18.2 per cent were employed in establishments where the prevailing hours were 54 but less than 60 per week, and 12.4 per cent in establishments where they were less than 54 per week.

Table 9 AVERAGE NUMBER OF WAGE EARNERS IN THE BRICK AND TILE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 64 and 60.	60.	Between 60 and 72.	72 and over.
United States.....	76,528	7,949	1,557	9,361	4,576	50,613	1,979	493
Alabama.....	1,353	140	13	37	64	1,006	97	17
Arkansas.....	585	.....	2	.....	.....	546	.....	.....
California.....	1,703	186	.....	1,410	.....	72	10	25
Colorado.....	922	328	.....	30	40	524	.....	.....
Connecticut and Rhode Island.....	1,312	107	28	367	16	768	28	.....
Georgia.....	1,901	61	160	.....	187	1,446	53	14
Illinois.....	6,574	2,249	25	1,491	278	2,481	60	.....
Indiana.....	3,788	212	86	428	118	2,937	7	.....
Iowa.....	3,158	95	22	300	116	2,329	262	34
Kansas.....	1,819	58	62	57	.....	1,642	52	.....
Kentucky.....	1,125	119	25	126	47	756	52	.....
Louisiana.....	583	37	.....	9	6	396	123	7
Maryland.....	1,226	89	.....	28	91	1,020	.....	.....
Massachusetts.....	991	32	46	107	207	567	13	19
Michigan.....	1,565	378	60	130	2	989	.....	.....
Minnesota.....	1,038	182	.....	40	17	798	1	.....
Mississippi.....	939	35	.....	27	.....	850	15	12
Missouri.....	2,999	17	6	42	26	2,814	93	62
Nebraska.....	831	70	28	17	18	672	28	.....
New Jersey.....	3,405	160	137	564	270	2,274	.....	.....
New York.....	8,080	1,467	121	1,449	258	4,667	49	89
North Carolina.....	1,460	19	86	22	288	992	43	10
Ohio.....	7,463	355	65	852	529	5,776	22	87
Oklahoma.....	730	15	.....	46	.....	669	.....	.....
Pennsylvania.....	8,058	562	383	791	1,206	5,084	.....	31
South Carolina.....	888	68	12	.....	46	594	147	22
Tennessee.....	1,281	28	27	43	51	1,017	26	89
Texas.....	1,935	20	30	222	43	1,488	128	4
Utah.....	514	253	.....	91	9	161	.....	.....
Virginia.....	2,090	137	60	49	195	1,633	16	.....
Washington.....	1,300	5	.....	109	12	674	500	.....
West Virginia.....	882	90	3	80	32	697	.....	.....
Wisconsin.....	1,027	.....	20	18	38	911	40	.....

Of the seven groups shown in the table, by far the largest was that made up of the wage earners in establishments where the prevailing hours were 60 per week, such wage earners constituting 66.1 per cent of the total number. This group was the most important, likewise, in all but two of the individual states for which figures are given. In California, however, 82.8 per cent of the wage earners were employed in establishments where the prevailing hours were 54 per week, while in Utah the largest number were employed in establishments where they were 48 or less per week.

Character of ownership.—Table 10 presents statistics with respect to the character of ownership of the establishments in the brick and tile industry in 1909 and 1904.

In 1909, of the total number of establishments reported for the industry, 34.8 per cent were under corporate ownership, as compared with 24.6 per cent in 1904. While corporations thus controlled a little more than one-third of the total number of establishments in 1909 and about one-fourth in 1904, the value of products of these establishments represented 69 per cent of the total value of products for the industry

in 1909 and 57.9 per cent in 1904. Establishments under individual and under firm ownership show a decrease in number during the five-year period and establishments under individual ownership a decrease in value of products.

Table 10

CHARACTER OF OWNERSHIP.	BRICK AND TILE INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	4,215	4,634	\$92,776,504	\$71,152,062
Individual.....	1,666	2,202	15,261,103	16,437,795
Firm.....	1,084	1,284	13,526,197	13,357,288
Corporation.....	¹ 1,465	1,138	¹ 63,989,204	41,215,603
Other.....		10		91,376
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	39.5	47.5	16.4	23.2
Firm.....	25.7	27.7	14.6	18.8
Corporation.....	¹ 34.8	24.6	¹ 69.0	57.9
Other.....		0.2		0.1

¹ Includes one establishment under cooperative ownership, to avoid disclosure of individual operations.

Table II gives statistics for 1909 with respect to establishments under each form of ownership, for the leading states.

Table 11

BRICK AND TILE INDUSTRY: 1909

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	1,668	1,084	¹ 1,465	13,621	12,018	150,889	\$15,261,103	\$13,526,197	\$63,989,204	\$11,848,547	\$10,412,181	\$48,781,674
Alabama.....	32	10	29	482	115	756	389,357	80,466	665,311	298,642	59,512	488,991
Arkansas.....	11	17	14	41	147	397	48,370	94,563	458,101	37,032	79,835	316,086
California.....	17	7	54	102	111	1,490	194,240	154,174	2,407,894	132,013	119,378	1,553,098
Colorado.....	26	10	33	126	57	739	177,726	70,470	1,421,846	142,586	56,279	959,774
Connecticut and Rhode Island.....	12	8	18	317	171	824	345,975	218,253	910,349	279,489	179,982	714,431
Georgia.....	21	24	30	310	262	1,329	290,658	174,294	1,246,144	209,463	128,428	839,092
Illinois.....	146	100	94	862	777	4,935	1,220,274	1,103,109	7,441,668	986,633	839,561	5,447,499
Indiana.....	157	79	75	865	388	2,535	962,442	463,389	3,293,092	729,736	367,645	2,315,955
Iowa.....	96	70	69	492	691	1,975	631,546	982,025	2,869,196	464,805	736,845	2,076,677
Kansas.....	5	8	42	17	59	1,743	24,380	63,640	2,248,418	17,603	57,525	1,730,505
Kentucky.....	24	16	42	149	120	856	142,372	77,199	795,876	117,546	63,814	600,107
Louisiana.....	18	12	18	174	143	266	139,990	104,179	252,328	108,817	82,498	193,797
Maryland.....	12	11	17	140	84	1,002	139,467	62,198	768,960	104,415	45,588	571,136
Massachusetts.....	31	9	12	462	138	391	545,388	151,708	546,149	407,735	116,307	389,305
Michigan.....	43	41	40	275	343	947	340,472	454,397	1,252,342	260,810	347,833	863,328
Minnesota.....	38	18	26	283	285	470	347,331	342,423	752,395	258,978	246,899	557,996
Mississippi.....	28	19	26	207	324	408	188,667	241,785	363,693	151,871	180,000	258,230
Missouri.....	58	24	40	194	121	2,684	204,639	111,648	3,359,987	160,222	86,425	2,417,306
Nebraska.....	38	19	23	150	181	500	225,609	205,225	730,272	168,241	170,657	544,194
New Jersey.....	33	12	31	582	289	2,534	597,706	279,774	3,195,806	500,009	222,062	2,607,452
New York.....	61	66	78	1,562	2,246	4,272	1,688,280	2,391,025	4,353,499	1,411,258	1,928,163	3,376,103
North Carolina.....	60	58	41	429	473	558	347,677	364,740	461,334	246,507	240,697	318,857
Ohio.....	211	153	153	994	1,095	5,377	1,200,580	1,407,180	6,749,970	934,044	1,096,681	5,122,662
Oklahoma.....	10	9	19	60	71	599	88,172	115,914	824,607	68,140	87,427	647,085
Pennsylvania.....	102	83	141	1,530	1,752	4,776	1,584,534	2,064,467	5,576,203	1,241,749	1,615,075	3,915,341
South Carolina.....	20	16	10	312	195	381	280,617	145,987	303,939	172,397	87,376	202,767
Tennessee.....	46	29	16	369	351	561	307,894	314,907	685,025	216,761	211,212	534,324
Texas.....	33	6	50	454	38	443	527,882	43,275	1,973,545	421,523	33,401	1,323,745
Utah.....	15	10	9	34	34	446	40,609	55,594	586,884	32,926	42,925	471,736
Virginia.....	34	22	30	471	299	1,320	384,712	289,438	1,248,326	286,118	208,989	916,985
Washington.....	19	19	20	146	118	1,036	271,222	204,040	2,083,566	231,142	166,346	1,519,935
West Virginia.....	5	4	25	43	14	825	27,195	16,120	907,049	18,033	12,928	644,112
Wisconsin.....	53	25	30	207	163	657	238,980	190,346	762,053	185,352	146,034	578,271

¹ Includes one establishment under cooperative ownership, to avoid disclosure of individual operations.

In 1909, of the total number of wage earners reported for the brick and tile industry, 13,621, or 17.8 per cent, were employed in establishments under indi-

vidual ownership; 12,018, or 15.7 per cent, in those under firm ownership; and 50,889, or 66.5 per cent, in those owned by corporations.

There was considerable variation among the states in the relative importance of the establishments under the different forms of ownership, but, as measured by value of products, those under corporate ownership predominate to a greater or less degree in all of the states for which statistics are shown in the table. In Illinois, the leading state in the industry, establishments controlled by corporations constituted 27.6 per cent of the total number in the state, gave employment to 75.1 per cent of the wage earners, and reported 76.2 per cent of the total value of products. In Massachusetts, however, the value of products reported by establishments under corporate ownership was but slightly in excess of that reported by establishments operated by individuals.

Size of establishments.—Table 12 presents statistics for 1909 and 1904 for establishments in the brick and tile industry grouped according to the value of their products.

Of the 4,215 establishments reported for 1909, only 3 manufactured products valued at \$1,000,000 or over, while in 1904 there were no establishments of this class reported. Establishments having products valued at \$100,000 or over reported 32.9 per cent of the total value of products in 1909 and 21.3 per cent in 1904; and establishments having products valued at between \$20,000 and \$100,000 reported 46.1 per cent of the

total value of products of the industry in 1909 and 48.3 per cent in 1904.

VALUE OF PRODUCTS PER ESTABLISHMENT.	BRICK AND TILE INDUSTRY.			
	Number of establishments.		Value of products.	
	1909	1904	1909	1904
Total	4,215	4,634	\$92,778,504	\$71,152,083
Less than \$5,000.....	1,571	2,050	3,013,782	5,200,941
\$5,000 and less than \$20,000.....	1,498	1,639	15,499,294	16,469,951
\$20,000 and less than \$100,000.....	1,001	865	42,783,137	34,356,811
\$100,000 and less than \$1,000,000.....	142	80	26,180,560	15,124,350
\$1,000,000 and over.....	3	—	4,399,731	—
Per cent of total	100.0	100.0	100.0	100.0
Less than \$5,000.....	37.3	44.2	4.2	7.3
\$5,000 and less than \$20,000.....	35.5	35.4	16.7	23.1
\$20,000 and less than \$100,000.....	23.7	18.7	46.1	48.3
\$100,000 and less than \$1,000,000.....	3.4	1.7	28.2	21.3
\$1,000,000 and over.....	0.1	—	4.7	—

The average value of products per establishment increased from \$15,354 in 1904 to \$22,011 in 1909, and the average value added by manufacture, as computed from the figures in Table 3, from \$11,833 to \$16,380. The average number of wage earners per establishment, likewise, shows an increase from 14.2 in 1904 to 18.2 in 1909.

Table 13 classifies the establishments in the leading states according to the number of wage earners employed.

STATE.	BRICK AND TILE INDUSTRY: 1909																		
	Total.		Establishments employing—																
			No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	
United States.....	4,215	78,528	39	1,795	5,161	1,392	16,253	871	21,763	226	15,515	80	11,709	8	2,581	3	2,113	1	1,48
Alabama.....	71	1,353	17	66	33	370	15	402	5	365	1	150	—	—	—	—	—	—	—
Arkansas.....	42	585	18	50	17	188	8	194	—	—	1	153	—	—	—	—	—	—	—
California.....	78	1,703	2	24	77	31	392	13	414	4	257	4	563	—	—	—	—	—	—
Colorado.....	69	922	34	108	28	302	7	214	1	62	1	236	—	—	—	—	—	—	—
Connecticut and Rhode Island.....	38	1,312	3	1	3	9	119	19	582	3	200	3	408	—	—	—	—	—	—
Georgia.....	75	1,901	16	52	27	356	25	807	4	274	3	412	—	—	—	—	—	—	—
Illinois.....	340	6,574	2	186	546	97	1,092	27	887	14	1,030	11	1,511	1	300	2	1,208	—	—
Indiana.....	311	3,788	4	190	516	81	906	18	643	12	843	5	620	1	260	—	—	—	—
Iowa.....	235	3,158	3	120	396	73	845	23	894	14	965	2	258	—	—	—	—	—	—
Kansas.....	55	1,819	10	23	8	84	25	861	12	851	—	—	—	—	—	—	—	—	—
Kentucky.....	82	1,125	33	102	31	353	16	501	1	52	1	117	—	—	—	—	—	—	—
Louisiana.....	48	583	17	65	23	211	7	216	1	91	—	—	—	—	—	—	—	—	—
Maryland.....	40	1,226	12	36	15	164	7	267	4	266	1	197	1	296	—	—	—	—	—
Massachusetts.....	52	991	7	23	28	355	13	399	4	214	—	—	—	—	—	—	—	—	—
Michigan.....	124	1,565	62	184	42	521	15	442	3	193	2	225	—	—	—	—	—	—	—
Minnesota.....	82	1,038	2	25	74	42	466	11	328	2	170	—	—	—	—	—	—	—	—
Mississippi.....	73	939	1	29	98	31	358	11	383	1	100	—	—	—	—	—	—	—	—
Missouri.....	120	2,999	2	71	166	27	337	13	390	4	260	2	363	—	—	—	—	1	1,48
Nebraska.....	78	831	2	45	116	19	255	10	296	2	164	—	—	—	—	—	—	—	—
New Jersey.....	78	3,405	15	42	25	324	22	711	7	474	6	949	—	—	1	905	—	—	—
New York.....	205	8,080	25	72	60	828	70	2,281	34	2,370	15	2,151	1	378	—	—	—	—	—
North Carolina.....	159	1,460	1	71	204	71	767	16	489	—	—	—	—	—	—	—	—	—	—
Ohio.....	517	7,466	4	276	752	141	1,521	59	1,929	27	1,788	10	1,476	—	—	—	—	—	—
Oklahoma.....	38	730	11	37	14	153	9	288	4	252	—	—	—	—	—	—	—	—	—
Pennsylvania.....	326	8,058	66	223	129	1,595	93	3,223	33	2,241	5	776	—	—	—	—	—	—	—
South Carolina.....	45	888	18	44	17	204	7	236	4	274	1	130	—	—	—	—	—	—	—
Tennessee.....	91	1,281	49	148	25	302	12	353	3	203	2	275	—	—	—	—	—	—	—
Texas.....	89	1,935	16	54	40	471	29	1,042	3	215	1	163	—	—	—	—	—	—	—
Utah.....	34	514	2	24	56	3	40	2	71	2	122	1	225	—	—	—	—	—	—
Virginia.....	86	2,090	27	94	31	386	19	584	7	522	1	238	1	266	—	—	—	—	—
Washington.....	58	1,300	26	70	20	213	10	271	—	—	2	748	—	—	—	—	—	—	—
West Virginia.....	34	882	5	13	19	210	7	255	2	119	—	—	1	285	—	—	—	—	—
Wisconsin.....	108	1,027	1	59	146	39	442	6	173	2	143	1	123	—	—	—	—	—	—

Of the 4,215 establishments reported in 1909, only 39, or nine-tenths of 1 per cent, employed no wage earners; 75.6 per cent employed from 1 to 20, and 21.3 per cent from 21 to 100. There were 92 establishments that employed over 100 wage earners each, and of these, 1 employed more than 1,000.

Of the total number of wage earners, 28 per cent were reported by establishments employing from 1 to 20; 48.7 per cent by establishments employing from 21 to 100, and 23.3 per cent by establishments employing more than 100 wage earners each.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses reported in 1909 for the brick and tile industry in the United States to have been \$75,744,418, divided as follows: Cost of materials, \$23,736,102, or 31.3 per cent; wages, \$37,138,584, or 49 per cent; salaries, \$5,438,807, or 7.2 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$9,430,925, or 12.5 per cent. As may be seen from Table 17, the proportion of total expenses represented by each of the various classes of expenses varies somewhat in the different states. Reference has already been made to the small proportion of total expenses represented by cost of materials, due to the fact that the cost of clay, the principal material, is represented in wages. Of the total cost of materials in 1909, as shown in Table 17, nearly three-fourths (74.9 per cent) was for fuel and rent of power.

Engines and power.—The amount of power used in the manufacture of brick and tile was first reported at the census of 1869. The total horsepower used increased from 10,551 in 1869 to 341,169 in 1909. Table 14 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the brick and tile industry increased from 176,700 horsepower in 1899 to 341,169 horsepower in 1909, or 93.1 per cent during the decade. In 1909, as in 1904 and 1899, the power of steam engines constituted more than nine-tenths of the total primary power, but in spite of a large increase

between 1899 and 1904 steam power formed a smaller proportion of the total in 1909 than in 1899—91.8 per cent, as compared with 99.3 per cent. The horsepower of gas and other internal-combustion engines increased from 909 in 1899 to 10,615 in 1909. No rented electric power was reported for the industry in 1899, but in 1904, 2,566 horsepower, and in 1909 16,719 horsepower, was reported. The number and horsepower of electric motors used for distributing power by means of current generated in the establishments themselves also show a very decided increase.

Table 14

BRICK AND TILE INDUSTRY.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	5,286	4,436	3,642	341,169	255,362	176,700	100.0	100.0	100.0
Owned.....	4,792	4,351	3,842	324,358	252,384	176,700	95.1	98.8	100.0
Steam.....	4,413	4,113	3,781	313,164	246,206	175,456	91.8	96.4	99.3
Gas.....	365	222	45	10,615	5,245	909	3.1	2.1	0.5
Water wheels.....	7	15	10	202	457	208	0.1	0.1	0.1
Water motors.....	2	1	(¹)	70	1	(¹)	(²)	(²)	.....
Other.....	5	.....	6	307	481	127	0.1	0.2	0.1
Rented.....	494	85	(¹)	16,811	2,978	.....	4.9	1.2	.....
Electric.....	494	85	(¹)	16,719	2,566	.....	4.9	1.0	.....
Other.....	.....	.....	.....	92	412	.....	(²)	0.2	.....
Electric motors.	708	126	17	21,130	3,036	505	100.0	100.0	100.0
Run by current generated by establishment.....	214	43	17	4,411	470	505	20.9	15.5	100.0
Run by rented power.....	494	85	(¹)	16,719	2,566	.....	79.1	84.5	.....

¹ Not reported.

² Less than one-tenth of 1 per cent.

Table 15 shows, for 1909, the amount of each of the several kinds of power and of the different kinds of fuel used in the industry in 34 of the leading states.

The states which ranked highest with respect to the amount of power used in 1909 were Pennsylvania, Ohio, Illinois, New York, Iowa, and Indiana, the six states which ranked highest in value of products. The total primary power reported for these states in 1909 was 181,399, or 53.2 per cent of the aggregate for the United States. Steam was the most important power in all of the states shown separately, except Utah, where rented electric power was used to a greater extent than any other form of power. The largest amount of steam power—35,454 horsepower—is shown for Ohio, and the largest amount of electric power—3,151 horsepower—for California.

Table 15

BRICK AND TILE INDUSTRY: 1909

STATE.	Primary horsepower.									Electric horsepower.		Fuel used.					
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.					Rented.		Total rented and generated by establishments.	Generated in the establishments reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.	Other.			Anthracite (long tons).	Bituminous (short tons).				
United States..	3,523	341,189	324,368	313,164	10,615	272	307	18,719	92	21,130	4,411	236,336	5,773,232	40,785	1,069,973	1,040,406	16,003,046
Alabama.....	64	5,127	5,112	5,075	37			15		21	6		113,766	946	24,224	29	
Arkansas.....	27	2,178	2,178	2,128			50						22,445		19,894	1	289,500
California.....	68	8,972	5,821	5,607	214			3,151		3,219	68	1,220	8,336		1,042	507,017	
Colorado.....	45	3,923	3,298	3,292	5		1	625		705	80	2,732	110,420	195	1,682	1	
Connecticut and Rhode Island..	35	5,193	4,953	4,865	73	15		240		240		1,887	19,928		45,842	118	
Georgia.....	74	7,476	7,371	7,252	44		75	105		111	6	600	140,786	1,009	42,649	97	
Illinois.....	296	36,013	35,433	35,194	237		2	580		1,728	1,148	3,775	964,310	1,236	26,062	118,752	3,550
Indiana.....	273	19,881	19,766	19,283	483			115		303	188	330	469,978	2,156	20,452	12,308	58,782
Iowa.....	199	20,782	20,527	20,250	227		50	255		766	511	1,500	467,742	560	1,608	201	
Kansas.....	53	9,827	9,457	8,189	1,268			370		689	319		45,896	90	35,468	6,425,747	
Kentucky.....	65	4,463	4,413	4,376	37			50		60	10		78,806	3,563	8,272	19	7,500
Louisiana.....	40	2,910	2,910	2,890	20							156	1,338		40,505	6,018	18,990
Maryland.....	31	4,815	4,815	4,808	7							94	71,437		3,429	5	44,609
Massachusetts..	40	2,967	2,672	2,585	62	25		295		295		1,513	10,257		58,200	68	
Michigan.....	120	8,346	8,305	7,942	313	50		41		116	75	2,326	97,977	1,124	24,770	76,488	
Minnesota.....	73	5,867	5,565	5,443	122			302		313	11	65	58,613	155	44,839	177	
Mississippi.....	57	3,653	3,553	3,553				100		150	50		41,897	295	39,575	4	
Missouri.....	84	8,274	7,994	7,438	556			190	90	190		97	287,021	2,104	30,877	38	598,609
Nebraska.....	61	4,033	3,586	3,308	203		75	447		447			56,009	2,027	1,825	2,155	
New Jersey.....	71	11,419	10,003	9,943	60			1,416		1,549	133	29,870	168,403	4,202	8,426	133	708
New York.....	192	28,734	26,671	25,794	807	70		2,063		2,273	210	124,523	138,501	4,138	61,986	7,159	46,632
North Carolina..	137	6,759	6,672	6,672				87		87		418	33,794	290	105,192	22	
Ohio.....	480	37,742	37,546	35,454	2,070	22		196		917	721	2,957	953,209	1,557	43,685	1,068	1,780,136
Oklahoma.....	35	3,733	3,523	3,268	255			210		335	125		29,115		3,198	6	1,732,605
Pennsylvania....	297	38,247	37,814	34,938	2,876			433		677	244	57,513	590,730	6,758	4,386	1,517	3,852,614
South Carolina..	44	2,824	2,567	2,531	36			257		257			36,642		44,240	134	
Tennessee.....	62	4,631	4,564	4,524	36		4	67		67			107,726	3,502	23,121	72	
Texas.....	65	7,488	7,486	7,335	101		50			230	230		118,797		63,305	250,625	87,868
Utah.....	12	1,556	426	360	4	62		1,130		1,130			27,222		1,047	2	
Virginia.....	73	5,540	5,435	5,400	35			105		125	20		140,895	1,056	19,358	50	
Washington.....	41	4,797	3,445	3,445				1,352		1,541	189		91,805	213	62,057	402	
West Virginia...	34	4,983	4,808	4,790	18			175		175		4,018	72,137	373	2	1,054,911	
Wisconsin.....	86	5,640	5,455	5,269	158	28		185		235	50		106,653	2,184	31,278	324	288
All other states..	189	12,376	10,214	9,963	251			2,162		2,179	17	418	90,041	1,052	162,722	19,926	

Fuel consumed.—The clay products industries are large consumers of fuel, this being one of the principal items of expense. There were 5,773,232 short tons of bituminous coal consumed in the brick and tile industry in 1909, the largest quantity for a single state being reported for Illinois, and the second largest for Ohio.

The largest quantity of anthracite coal, 124,523 long tons, or more than one-half the total for the country, was reported for New York. Wood, natural gas, and oil were also used to a great extent, the largest quantity of wood being reported for North Carolina, of natural gas for Kansas, and of oil for California.

DETAILED STATE TABLES.

The principal data secured by the census inquiry concerning the brick and tile industry are presented in Tables 16 and 17.

Table 16 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 17 gives more detailed statistics for the brick and tile industry for 1909 only.

BRICK AND TILE—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States.....	1909	4,215	85,764	4,285	4,951	76,528	341,169	\$174,673	\$5,439	\$37,139	\$23,736	\$92,777	\$69,041
	1904	4,634	76,006	5,295	3,690	66,021	265,362	119,967	3,530	29,848	16,316	71,152	64,836
	1899	6,423	71,057	6,652	2,426	61,979	176,700	82,088	2,025	21,883	11,006	51,270	40,264
Alabama.....	1909	71	1,500	56	91	1,353	5,127	1,942	100	434	288	1,135	847
	1904	63	1,178	60	74	1,044	3,360	1,033	72	301	204	847	643
	1899	72	1,259	93	44	1,122	1,501	432	25	257	143	658	515
Arizona.....	1909	21	126	28	98	100	130	130	56	27	117	90	
	1904	5	35	5	30	143	79	79	20	16	46	30	
	1899	19	116	24	3	89	25	57	3	47	15	102	87
Arkansas.....	1909	42	697	55	57	585	2,178	1,300	60	219	168	601	433
	1904	55	629	68	36	525	1,851	943	37	186	197	792	695
	1899	55	491	66	23	402	555	310	18	100	52	277	225
California.....	1909	78	1,879	35	141	1,703	8,972	9,169	162	1,146	952	2,756	1,804
	1904	69	1,504	46	101	1,357	5,067	3,929	102	825	335	1,916	1,581
	1899	56	825	60	45	720	1,468	1,205	43	333	166	834	668
Colorado.....	1909	69	1,036	46	68	922	3,923	2,421	79	637	511	1,670	1,159
	1904	63	580	52	33	495	2,192	1,036	39	322	165	817	652
	1899	65	532	76	18	438	1,083	526	18	237	86	497	411
Connecticut and Rhode Island.....	1909	38	1,417	37	68	1,312	5,193	2,812	98	673	301	1,475	1,174
	1904	34	1,138	34	63	1,041	3,254	1,890	64	475	198	1,081	883
	1899	37	1,126	39	68	1,029	3,421	1,578	60	421	177	901	724
Delaware.....	1909	23	352	19	33	300	834	835	34	116	55	329	274
	1904	21	246	24	13	209	479	272	13	86	27	205	178
	1899	25	251	27	9	215	342	284	9	70	22	168	146
District of Columbia.....	1909	5	210	5	10	195	911	252	9	79	56	182	126
	1904	8	274	8	9	257	770	422	10	90	46	186	140
	1899	11	466	12	17	437	502	716	16	166	63	364	301
Florida.....	1909	29	501	21	41	439	2,288	778	39	138	113	379	266
	1904	14	459	15	19	425	903	342	17	109	65	237	172
	1899	17	288	19	11	258	488	196	10	66	33	135	102
Georgia.....	1909	75	2,085	73	111	1,901	7,476	2,771	132	547	534	1,711	1,177
	1904	69	1,622	77	99	1,446	5,479	1,814	92	350	365	1,337	972
	1899	70	1,837	77	59	1,701	3,120	1,045	46	347	264	1,053	789
Idaho.....	1909	36	347	39	22	286	1,050	800	18	179	109	444	335
	1904	19	95	21	2	72	147	91	3	45	27	113	86
	1899	23	71	28	-----	43	20	49	-----	18	8	44	36
Illinois.....	1909	340	7,347	384	389	6,574	36,013	18,495	466	4,386	2,491	9,765	7,274
	1904	435	6,275	609	303	5,463	28,059	12,988	350	3,052	1,705	7,546	5,841
	1899	566	6,120	688	208	5,224	23,876	9,199	217	2,131	1,026	5,081	4,055
Indiana.....	1909	311	4,361	336	237	3,788	19,881	7,455	251	1,835	1,306	4,719	3,413
	1904	392	4,009	498	176	3,335	15,896	5,449	172	1,403	982	3,818	2,836
	1899	558	4,448	691	148	3,609	12,721	4,505	104	1,195	552	2,931	2,379
Iowa.....	1909	235	3,654	272	224	3,158	20,782	7,327	300	1,673	1,204	4,483	3,279
	1904	302	3,154	366	155	2,633	14,645	4,801	146	1,242	838	3,362	2,524
	1899	339	2,521	441	94	1,986	8,567	3,076	65	769	460	1,976	1,516
Kansas.....	1909	55	1,978	28	131	1,819	9,827	3,930	141	911	531	2,336	1,805
	1904	65	1,974	65	109	1,800	7,240	3,473	117	841	444	1,907	1,463
	1899	57	1,021	67	49	905	2,274	755	29	314	166	724	568
Kentucky.....	1909	82	1,267	61	81	1,125	4,463	2,160	78	400	234	1,015	781
	1904	85	1,277	96	67	1,114	3,098	1,563	48	362	176	887	711
	1899	84	1,051	97	36	918	1,890	805	26	282	128	631	503
Louisiana.....	1909	48	673	43	47	683	2,910	1,256	36	204	111	496	385
	1904	62	1,150	58	65	1,027	3,215	1,343	50	399	210	972	762
	1899	58	1,153	66	43	1,044	1,217	672	26	261	102	532	430
Maine.....	1909	49	330	44	23	263	889	529	20	160	105	390	285
	1904	66	416	68	18	330	880	599	13	165	118	420	302
	1899	71	494	78	24	392	491	455	8	162	108	440	334
Maryland.....	1909	40	1,331	36	69	1,226	4,815	5,117	78	463	250	971	721
	1904	50	1,590	50	76	1,464	4,353	5,337	78	534	227	1,097	870
	1899	45	1,608	50	57	1,501	2,613	3,998	52	453	156	844	688
Massachusetts.....	1909	52	1,104	53	60	991	2,967	1,476	67	509	330	1,243	913
	1904	64	1,208	63	47	1,098	3,745	2,461	41	496	330	1,171	841
	1899	81	1,591	108	54	1,429	3,858	2,319	44	622	400	1,468	1,068

BRICK AND TILE—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.					Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).							
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).	Expressed in thousands.														
							Capital.								Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).		
Michigan.....	1909	124	1,806	140	101	1,565	8,346	\$3,017	\$97	\$803	\$575	\$2,047	\$1,472								
	1904	169	1,731	206	89	1,436	8,147	2,182	73	651	425	1,651	1,226								
	1899	177	1,715	220	52	1,443	6,649	1,497	30	480	239	1,136	897								
Minnesota.....	1909	82	1,200	79	63	1,038	5,867	2,590	87	538	378	1,442	1,064								
	1904	101	1,177	132	52	993	4,129	1,688	43	466	290	1,227	937								
	1899	104	1,008	125	34	849	2,484	1,041	23	329	185	772	587								
Mississippi.....	1909	73	1,088	73	76	939	3,653	1,288	65	287	204	794	590								
	1904	74	1,054	88	63	903	2,368	847	45	272	177	783	606								
	1899	74	1,040	94	38	908	1,483	495	20	201	99	522	423								
Missouri.....	1909	120	3,289	121	169	2,999	8,274	7,138	226	1,469	1,012	3,676	2,664								
	1904	162	2,679	181	161	2,337	6,945	7,458	179	1,119	669	2,599	1,930								
	1899	219	2,797	260	97	2,440	4,378	6,051	113	867	472	1,988	1,516								
Montana.....	1909	21	230	24	17	189	1,135	519	24	166	83	371	288								
	1904	14	118	13	8	97	539	240	13	77	38	179	141								
	1899	23	160	27	9	124	248	107	4	69	30	134	104								
Nebraska.....	1909	78	978	80	67	831	4,033	2,649	67	465	278	1,161	883								
	1904	99	1,084	129	50	905	3,510	1,568	41	471	277	1,132	855								
	1899	106	1,029	134	40	855	2,254	1,276	26	327	203	840	637								
Nevada.....	1909	4	18	4	2	12	115	105	2	12	8	32	24								
	1904	5	31	9	1	21	120	73	3	16	6	38	32								
	1899	7	24	10		14		20		10	3	18	15								
New Hampshire.....	1909	29	443	24	24	395	727	586	27	199	156	533	377								
	1904	36	578	32	19	527	1,235	933	19	229	151	529	378								
	1899	55	696	71	34	591	1,068	656	18	228	147	538	391								
New Jersey.....	1909	76	3,619	64	150	3,405	11,419	7,355	205	1,625	844	4,073	3,229								
	1904	63	2,080	73	70	1,947	5,971	3,040	68	784	337	1,830	1,493								
	1899	76	2,525	76	79	2,870	4,798	3,607	83	836	320	1,846	1,526								
New Mexico.....	1909	13	112	9	11	92	668	330	13	42	32	123	91								
	1904	10	79	11	4	64	163	42	4	31	18	81	63								
	1899	10	101	16	4	81	255	30	4	34	19	77	58								
New York.....	1909	205	8,630	212	338	3,080	28,734	13,864	406	3,958	1,717	8,433	6,716								
	1904	192	7,193	213	243	6,737	19,090	10,964	281	3,161	1,368	7,430	6,062								
	1899	217	7,178	258	183	6,737	18,107	8,741	167	2,765	1,109	5,684	4,575								
North Carolina.....	1909	159	1,762	197	105	1,460	6,759	1,455	83	370	368	1,174	806								
	1904	111	1,271	146	46	1,079	3,222	651	25	247	163	696	528								
	1899	157	1,660	216	36	1,408	2,493	445	11	269	147	641	494								
North Dakota.....	1909	13	214	11	15	188	668	769	25	88	73	287	214								
	1904	14	142	10	15	117	407	204	10	60	34	170	136								
	1899	12	132	20	4	108	165	174	3	48	30	132	102								
Ohio.....	1909	517	8,575	869	640	7,466	37,742	17,315	589	3,527	2,204	9,358	7,154								
	1904	590	7,839	704	416	6,719	33,291	12,049	390	2,942	1,633	7,136	5,503								
	1899	636	6,414	853	208	5,353	22,715	7,344	189	1,967	982	4,630	3,648								
Oklahoma.....	1909	38	823	32	61	730	3,733	1,303	61	378	226	1,029	803								
	1904	150	482	47	34	401	3,029	733	34	186	123	510	382								
	1899	149	283	64	6	218	378	186	6	81	31	185	154								
Oregon.....	1909	61	487	71	31	385	1,922	1,250	34	266	155	676	520								
	1904	43	330	56	10	264	766	366	9	132	63	315	252								
	1899	46	290	58	12	220	511	194	9	98	37	227	190								
Pennsylvania.....	1909	326	8,943	349	536	8,058	38,247	20,150	546	3,881	2,453	9,225	6,772								
	1904	370	8,430	445	424	7,561	31,235	13,887	355	3,213	1,599	7,280	5,631								
	1899	335	7,509	507	269	6,733	20,921	10,607	248	2,626	1,138	6,954	4,816								
South Carolina.....	1909	45	990	50	52	888	2,824	935	37	233	268	731	463								
	1904	47	963	52	36	875	2,531	517	29	134	177	656	479								
	1899	76	1,293	107	41	1,145	2,342	341	20	241	132	674	442								
South Dakota.....	1909	12	72	5	13	54	790	227	10	28	31	103	72								
	1904	10	64	9	6	49	355	175	3	27	20	84	64								
	1899	11	67	19		48	162	64		20	13	46	33								
Tennessee.....	1909	91	1,487	112	94	1,281	4,631	1,868	82	443	346	1,308	962								
	1904	84	1,410	108	63	1,234	3,165	1,200	65	378	265	1,100	835								
	1899	91	1,307	121	34	1,152	2,821	891	31	293	166	685	519								
Texas.....	1909	89	2,135	60	150	1,935	7,488	3,607	168	797	766	2,545	1,779								
	1904	92	1,460	71	81	1,308	3,397	1,669	74	470	366	1,305	939								
	1899	143	1,804	161	64	1,679	2,456	1,293	61	420	234	1,020	786								
Utah.....	1909	34	685	40	31	614	1,656	1,190	31	332	136	683	647								
	1904	39	359	53	15	291	737	433	13	172	63	346	278								
	1899	49	337	77	11	249	207	171	7	89	33	187	154								
Vermont.....	1899	7	80	6	4	70	160	108	3	30	14	65	51								
	1904	9	126	11	7	108	258	100	5	47	21	104	83								
	1899	15	135	15	5	115	194	99	4	43	18	100	82								
Virginia.....	1909	86	2,311	87	134	2,090	6,640	3,983	142	732	570	1,922	1,412								
	1904	84	2,170	84	123	1,964	4,977	3,146	118	620	429	1,804	1,375								
	1899	80	1,664	90	86	1,418	3,119	1,631	46	404	196	1,006	811								

¹ Includes Indian Territory.

BRICK AND TILE—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
Washington.....	1909	58	1,447	61	86	1,300	4,797	\$5,188	\$116	\$792	\$651	\$2,559	\$1,908
	1904	51	609	52	45	512	1,486	966	37	306	149	675	526
	1899	32	385	29	27	329	624	370	23	186	81	427	346
West Virginia.....	1909	34	979	17	80	882	4,983	2,300	73	383	275	950	675
	1904	37	840	29	48	763	3,447	1,962	55	330	210	870	660
	1899	42	620	48	22	550	1,680	610	18	184	97	436	339
Wisconsin.....	1909	108	1,219	117	75	1,027	5,640	2,533	60	510	282	1,191	909
	1904	141	1,868	146	84	1,638	5,951	3,052	74	686	553	1,848	1,295
	1899	168	1,695	165	61	1,469	5,156	2,211	48	542	730	1,796	1,066
Wyoming.....	1909	13	47	10	3	34	129	96	2	30	15	70	55
	1904	3	10	2	2	6	65	14	1	6	2	17	15
	1899	4	15	4	4	11	-----	7	-----	5	1	9	8

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.						Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Average number.	Wage earners.		Total.	16 and over.		Under 16.					
					Male.	Female.		Number, 15th day of—			Male.	Female.	Male.	Female.				
								Maximum month.	Minimum month.									
1 United States	4,215	85,764	4,285	8,818	1,434	299	76,528	Jy 104,930	Ja 88,312	92,900	81,261	97	1,541	1	841,169			
2 Alabama	71	1,500	56	67	19	5	1,353	Se 1,689	Fe 808	1,657	1,589	.....	68	.....	5,127	
3 Arizona	21	126	28	.....	.....	.....	98	Oc 141	Au 59	178	178	.....	.....	.....	100
4 Arkansas	42	697	55	30	24	3	585	Jy 790	Ja 284	713	689	.....	24	.....	2,178	
5 California	78	1,879	35	85	46	10	1,703	Jy 2,223	Fe 941	1,801	1,778	1	22	.....	8,972		
6 Colorado	69	1,036	46	47	18	3	922	Jy 1,308	Ja 575	1,213	1,194	1	18	.....	3,923		
7 Connecticut and Rhode Island	38	1,417	37	49	15	4	1,312	Jy 2,085	Ja 253	1,089	1,087	2	.....	.....	5,193	
8 Delaware	23	352	19	17	12	4	300	Au 425	Fe 133	365	351	2	12	.....	834		
9 District of Columbia	5	210	5	4	4	2	195	Jy ¹ 249	Ja 89	171	171	.....	.....	.....	911
10 Florida	29	501	21	27	14	.....	439	Ap 489	Fe 373	558	525	.....	33	.....	2,288
11 Georgia	75	2,085	73	82	26	3	1,901	My ¹ 2,196	Ja 1,337	2,169	2,116	2	51	.....	7,476		
12 Idaho	36	347	39	16	6	.....	286	Jy 544	De 81	395	387	1	7	.....	1,050	
13 Illinois	340	7,347	384	242	117	30	6,574	Je 8,302	Ja 3,795	7,849	7,796	.....	53	.....	36,013	
14 Indiana	311	4,361	336	165	55	17	3,788	Je 4,703	Ja 2,173	4,753	4,649	.....	103	1	19,881		
15 Iowa	235	3,684	272	159	52	13	3,158	Je 4,093	Ja 1,594	3,707	3,678	.....	29	.....	20,782	
16 Kansas	55	1,978	28	76	41	14	1,819	Je 2,175	Ja 1,143	1,953	1,951	.....	2	.....	9,827	
17 Kentucky	82	1,267	61	65	13	3	1,125	Au 1,681	Ja 356	1,538	1,517	.....	21	.....	4,463	
18 Louisiana	48	673	43	37	9	1	583	Jy 791	Ja 247	816	767	1	48	.....	2,910		
19 Maine	49	330	44	16	4	3	263	Jy 539	Mh 32	401	398	.....	3	.....	889	
20 Maryland	40	1,331	36	47	20	2	1,226	Jy 1,693	Ja 742	1,177	1,152	.....	25	.....	4,815	
21 Massachusetts	52	1,104	53	38	18	4	991	Jy 1,808	Fe 160	1,127	1,125	1	1	.....	2,967		
22 Michigan	124	1,806	140	69	22	10	1,565	Jy 2,467	Fe 586	2,130	2,122	.....	8	.....	8,346	
23 Minnesota	82	1,200	79	53	20	10	1,038	Jy 2,014	Ja ¹ 246	1,632	1,613	1	18	.....	5,867		
24 Mississippi	73	1,088	73	59	15	2	939	My 1,234	Fe 445	1,350	1,273	.....	77	.....	3,653	
25 Missouri	120	3,289	121	95	67	7	2,989	Jy 3,899	Fe 1,635	3,246	3,151	.....	95	.....	8,274	
26 Montana	21	230	24	12	5	.....	189	Jy 336	Fe 19	266	265	1	.....	.....	1,135
27 Nebraska	78	978	80	43	23	1	831	Au 1,263	Ja 220	1,060	1,047	.....	13	.....	4,033	
28 Nevada	4	18	4	1	1	.....	12	Se 35	Ja ³ 0	22	22	.....	2	.....	115
29 New Hampshire	29	443	24	15	8	1	395	My 766	Mh 67	818	314	2	2	.....	727		
30 New Jersey	76	3,619	64	75	72	3	3,405	Au 4,621	Ja 1,529	3,960	3,877	36	47	.....	11,419		
31 New Mexico	13	112	9	10	1	.....	92	Jy 130	Mh 44	186	184	.....	2	.....	668
32 New York	205	8,630	212	208	118	12	8,080	Jy 13,787	Fe 1,431	10,015	10,004	.....	11	.....	28,734	
33 North Carolina	159	1,762	197	92	12	1	1,460	Au 2,281	Ja 406	2,448	2,265	.....	183	.....	6,750	
34 North Dakota	13	214	11	13	1	1	188	Je ¹ 385	Ja 40	284	277	.....	7	.....	668	
35 Ohio	517	8,575	569	368	132	45	7,466	Je 9,401	Ja 4,878	9,093	9,029	2	62	.....	37,742		
36 Oklahoma	38	823	32	39	20	2	730	Jy 932	Ja 369	943	941	.....	2	.....	3,733	
37 Oregon	61	487	71	14	16	1	385	Jy 747	Ja 78	735	729	1	5	.....	1,922		
38 Pennsylvania	326	8,943	349	322	165	49	8,058	Jy 9,927	Fe 4,668	9,271	9,105	21	145	.....	38,247		
39 South Carolina	45	990	50	39	9	4	886	Au 1,230	Ja ¹ 510	1,229	1,157	.....	72	.....	2,824	
40 South Dakota	12	72	5	11	2	.....	54	Je 106	Ja ¹ 8	103	103	.....	.....	.....	790
41 Tennessee	91	1,487	112	57	32	5	1,281	Jy 1,740	Fe 652	1,754	1,664	1	89	.....	4,631		
42 Texas	89	2,135	50	96	49	5	1,935	Jy 2,303	Ja 1,467	2,109	2,058	.....	51	.....	7,488	
43 Utah	3 ²	585	40	15	16	.....	514	Je 758	Ja 267	584	551	.....	33	.....	1,556
44 Vermont	7	80	6	4	.....	.....	70	Je 150	Ja 5	107	107	.....	.....	.....	150
45 Virginia	86	2,311	87	88	39	7	2,090	Au 2,641	Ja 1,317	2,400	2,334	12	54	.....	5,540		
46 Washington	58	1,447	61	56	24	6	1,300	Je 1,690	Ja 854	1,589	1,582	5	2	.....	4,797		
47 West Virginia	34	979	17	44	34	2	882	Je 1,179	Fe 386	915	902	3	10	.....	4,983		
48 Wisconsin	108	1,219	117	53	18	4	1,027	Je 1,914	Fe 280	1,413	1,331	1	31	.....	5,640		
49 Wyoming	13	47	10	3	.....	.....	34	Jy 98	Ja ² 0	108	108	.....	.....	.....	129

¹ Same number reported for one or more other months.

STATISTICS, BY STATES: 1909.

	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
1	\$174,672,805	\$75,744,418	\$4,170,824	\$1,267,983	\$37,138,584	\$17,788,091	\$5,948,011	\$434,885	\$714,404	\$569,437	\$7,712,199	\$92,776,504	\$69,040,402
2	1,942,486	950,014	81,391	18,698	434,341	244,237	43,752	2,931	7,644	-----	117,020	1,135,134	847,145
3	129,620	92,779	-----	-----	55,883	23,382	3,504	600	588	-----	8,722	117,448	90,562
4	1,300,239	602,346	33,365	26,843	219,252	132,332	35,749	650	4,240	-----	49,915	601,034	432,953
5	9,168,834	2,601,355	124,379	37,249	1,145,664	667,368	284,451	29,179	23,803	21,040	268,222	2,756,308	1,804,489
6	2,420,670	1,358,835	63,056	16,165	637,220	294,161	217,242	2,125	13,904	-----	114,962	1,670,042	1,158,639
7	2,812,117	1,214,678	79,359	18,505	672,715	249,527	61,148	9,839	13,017	18,569	101,999	1,474,577	1,173,902
8	835,148	280,751	21,039	13,233	116,450	39,484	15,167	1,360	1,003	34,029	38,956	926,454	274,803
9	252,181	163,957	5,036	3,652	78,800	38,249	17,541	550	1,603	-----	18,526	181,519	152,729
10	778,382	328,093	30,147	8,851	138,389	83,334	29,205	995	2,562	27	34,583	379,021	266,482
11	2,771,068	1,395,535	111,089	21,014	546,967	480,961	53,152	3,837	11,671	1,500	165,444	1,711,096	1,176,983
12	800,137	332,849	13,776	3,685	178,654	88,421	20,865	115	4,720	-----	22,613	443,623	334,337
13	18,495,247	8,285,610	347,258	118,882	4,386,450	1,805,102	686,256	13,897	79,548	33,094	815,572	9,765,551	7,273,693
14	7,455,305	3,871,916	198,486	52,280	1,834,927	832,182	473,405	25,405	43,053	85,888	326,290	4,718,923	3,413,336
15	7,326,525	3,536,594	260,652	39,120	1,672,547	1,038,635	165,805	4,005	24,100	5,229	326,501	4,482,267	3,278,327
16	3,930,102	1,871,168	101,820	38,539	910,734	447,827	82,978	2,980	18,587	17,642	250,061	2,336,438	1,805,633
17	2,160,341	812,951	67,696	9,994	399,737	178,077	55,903	3,600	9,342	645	88,057	1,015,447	781,467
18	1,255,697	428,488	32,984	3,400	204,165	98,144	13,241	330	5,365	300	70,559	976,497	385,112
19	628,785	300,432	14,930	4,475	150,142	97,560	7,444	1,830	3,453	5,861	14,737	390,167	285,163
20	5,117,008	874,324	65,793	11,640	462,570	212,818	36,668	2,001	11,653	1,749	69,432	970,625	721,139
21	1,476,337	1,030,100	50,304	16,912	609,302	295,175	34,723	9,062	16,553	-----	98,069	1,243,245	913,347
22	3,017,098	1,627,356	77,412	19,846	803,396	404,462	170,778	6,851	19,830	-----	124,781	2,047,211	1,471,971
23	2,589,632	1,165,897	61,541	25,760	537,546	321,610	56,666	2,300	11,593	11,091	137,790	1,442,149	1,063,873
24	1,287,689	629,339	66,379	8,440	287,491	169,015	35,029	268	8,004	10,172	54,541	794,145	590,101
25	7,138,407	3,040,987	168,222	58,186	1,468,929	710,154	302,167	8,702	29,799	77,983	216,846	3,676,274	2,663,953
26	518,544	298,313	18,508	5,000	165,728	62,491	20,905	600	2,054	-----	23,027	370,574	287,178
27	2,649,362	928,468	49,100	17,428	465,477	210,429	67,585	1,030	7,963	408	109,048	1,161,106	883,092
28	105,142	25,555	1,800	163	11,784	7,521	331	-----	208	-----	3,748	31,980	24,128
29	586,065	440,617	20,770	6,470	198,964	144,736	11,532	1,732	3,522	21,750	31,141	533,045	376,777
30	7,354,660	3,080,500	142,840	62,346	1,625,260	629,602	214,161	24,800	26,975	400	354,116	4,073,286	3,229,523
31	329,771	98,784	12,870	425	41,764	25,911	5,934	105	537	4,200	7,038	122,551	90,706
32	13,864,023	6,905,804	305,358	100,905	3,957,760	1,153,545	563,735	137,994	67,723	21,581	597,203	8,432,804	6,715,524
33	1,454,748	897,041	74,478	8,380	369,681	327,673	40,017	1,209	7,020	2,882	65,701	1,173,751	806,061
34	769,367	238,175	17,714	7,504	87,795	46,798	25,990	1,100	2,420	-----	48,854	286,921	214,133
35	17,314,892	7,418,610	453,138	136,235	3,527,475	1,797,155	407,188	7,648	78,589	93,030	618,152	9,357,730	7,153,387
36	1,303,172	755,496	47,902	12,621	378,350	169,824	66,117	1,754	6,663	2,300	79,865	1,028,693	802,652
37	1,249,815	516,078	19,282	14,942	265,838	139,103	16,044	4,743	4,472	13,254	38,400	674,520	619,373
38	20,150,106	8,029,554	406,631	139,210	3,881,202	1,626,288	826,751	89,447	68,210	18,817	973,498	9,225,204	6,772,165
39	935,372	585,825	31,453	5,528	232,701	188,011	79,992	-----	3,240	-----	44,900	730,543	462,540
40	226,870	79,632	8,855	726	27,504	19,838	10,736	5	1,126	-----	10,842	102,660	72,086
41	1,867,654	1,051,918	53,892	28,435	443,259	237,008	108,521	14,524	6,272	49,715	110,292	1,307,826	962,297
42	3,606,752	2,063,023	117,751	40,433	797,419	676,932	89,101	3,563	11,582	8,597	317,645	2,544,702	1,778,669
43	1,189,606	520,298	17,644	13,380	331,918	106,923	28,577	50	3,810	-----	17,996	683,087	547,587
44	107,821	50,143	3,398	-----	29,951	13,788	475	125	475	-----	1,931	64,744	60,481
45	3,983,120	1,540,155	111,211	31,067	731,707	416,569	93,815	4,197	9,925	3,774	137,890	1,922,476	1,412,092
46	5,187,951	1,657,307	89,708	26,308	792,228	421,475	229,930	4,559	13,236	1,314	78,549	2,558,828	1,907,423
47	2,300,229	831,675	52,667	20,605	383,019	167,088	108,203	60	7,573	118	92,342	950,364	675,073
48	2,532,998	985,201	45,840	14,504	509,507	232,766	48,956	2,188	14,860	2,978	113,602	1,191,379	909,657
49	95,690	49,892	1,900	-----	30,341	14,300	576	140	414	-----	2,221	69,535	54,659

* None reported for one or more other months.

POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS INDUSTRY.

Comparison with earlier censuses.—Table 18 summarizes the statistics of the pottery, terra-cotta, and fire-clay products industry for each census from 1849 to 1909, inclusive.

Table 18 MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.

CENSUS.	Number of establishments.	Wage earners (average number).	Wages.	Cost of materials.	Value of products.	Value added by manufacture.
1909.....	822	56,188	\$29,753,495	\$21,910,905	\$76,118,861	\$54,207,958
1904.....	873	52,428	25,177,665	16,591,462	64,209,792	47,609,330
1899.....	1,000	43,714	17,691,737	11,915,236 ¹	44,293,388	32,348,150
1889.....	707	18,980	8,869,032	5,618,401	22,057,090	18,438,689
1879.....	752	10,221	3,600,727	2,909,063	8,977,333	8,068,270
1869.....	777	6,116	2,247,173	1,702,705	6,045,536	4,342,831
1859.....	589	3,628	1,170,605	793,323	3,215,081	2,419,758
1849.....	518	2,456	655,334	294,351	1,578,628	1,284,277

The value of products in 1909 was more than forty-seven times as great as that in 1849. At each census since 1849 there was an increase reported in number of wage earners, value of products, and value added by manufacture. As in the brick and tile industry, the value of products for the manufacture of pottery, terra-cotta, and fire-clay products shows the largest relative increase (145.7 per cent) for the decade 1879-1889.

Summary, by states.—Table 19 summarizes the more important statistics for the industry, by states, the

states being arranged according to the value of products reported for 1909. Some of the states for which data can not be shown separately ranked higher than some named in the table.

Ohio was the most important state in the manufacture of pottery, terra-cotta, and fire-clay products, ranking first at the censuses of 1909 and 1904 in the average number of wage earners, value of products, and value added by manufacture. In 1909 the value of products for the state represented 27.8 per cent of the total for the United States. The number of wage earners employed in the industry in Ohio increased 39.2 per cent during the decade ending with 1909, and the value of products 78.7 per cent. New Jersey ranked second in 1909 and 1904 in average number of wage earners, value of products, and value added by manufacture, while Pennsylvania held third place at each census in all three items. These three leading states together reported 62.3 per cent of the total value of products in 1909, as compared with 63.9 per cent in 1904. Illinois and Missouri each advanced in rank according to value of products, the former from fifth place in 1904 to fourth in 1909, and the latter from sixth to fifth place. New York, on the other hand, dropped from fourth place in value of products in 1904 to sixth place in 1909.

Table 19 MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.

STATE.	Number of establishments: 1909	Wage earners.			Value of products.				Value added by manufacture.				Per cent of increase. ¹						
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.		Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).		Value of products.		Value added by manufacture.			
							1909	1904				1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
		United States.	822	56,188	100.0	\$76,118,861	100.0	\$54,207,958	100.0	28.5	7.1	19.9	72.0	18.8	45.0	67.6	13.9	47.2
Ohio.....	186	16,519	29.4	1	21,173,272	27.8	1	14,711,792	27.1	1	39.2	3.8	34.1	78.7	14.1	56.5	70.6	7.2	59.2
New Jersey.....	88	9,815	17.5	2	13,139,000	17.3	2	9,587,532	17.7	2	20.9	3.5	16.9	47.0	12.1	31.0	46.2	9.4	83.5
Pennsylvania.....	139	9,003	16.0	3	13,072,108	17.2	3	8,962,738	16.5	3	1.5	3.9	-2.3	90.8	21.5	32.4	57.9	14.2	38.3
Illinois.....	39	3,157	5.6	4	4,614,728	6.1	4	3,483,282	6.4	4	37.5	30.7	20.5	116.3	41.7	51.9	122.5	38.2	61.0
Missouri.....	29	3,138	5.6	5	4,068,701	5.3	5	2,992,532	5.5	5	95.3	23.9	57.6	144.8	32.0	85.5	131.7	28.4	80.4
New York.....	39	2,387	4.2	6	3,403,498	4.5	6	2,528,824	4.7	6	4.3	-12.1	18.7	42.4	3.5	37.7	35.4	4.6	29.5
Indiana.....	31	2,186	3.9	7	2,965,768	3.9	7	2,106,744	3.9	7	74.9	8.3	-61.5	129.7	12.2	104.7	115.2	6.5	104.0
West Virginia.....	16	2,034	3.6	8	2,678,673	3.5	8	1,893,025	3.5	8	60.3	60.2	0.1	142.4	108.3	16.4	113.7	101.4	6.1
California.....	26	1,027	1.8	10	1,797,129	2.4	9	1,291,940	2.4	9	162.7	19.4	119.9	139.3	2.0	134.5	163.7	-5.3	178.6
Kentucky.....	19	1,319	2.3	9	1,469,757	1.9	10	1,087,399	2.0	10	56.8	0.5	56.0	103.0	17.9	72.2	107.2	20.9	71.4
Maryland.....	16	720	1.3	11	756,795	1.0	11	550,683	1.0	11	-33.5	-22.2	-14.5	-9.3	-11.2	2.0	-13.8	-22.8	11.7
Massachusetts.....	20	465	0.8	13	644,236	0.8	13	465,782	0.9	13	-20.4	-18.0	-2.9	-9.7	-10.3	0.7	-11.4	-14.4	3.4
Georgia.....	27	592	1.1	12	613,868	0.8	14	460,723	0.8	14	107.7	.....	107.7	198.1	27.9	133.0	181.1	37.2	104.9
Texas.....	17	420	0.7	15	597,226	0.8	15	402,434	0.7	15	50.0	92.7	-22.1	210.9	82.6	70.3	171.6	56.4	73.6
Alabama.....	21	425	0.8	14	553,840	0.7	16	388,844	0.7	17	87.2	80.4	16.7	148.4	104.8	21.3	135.8	99.5	18.2
Washington.....	8	289	0.5	18	523,350	0.7	17	411,432	0.8	15	129.4	78.4	28.6	233.1	25.7	165.0	221.1	39.3	130.5
Iowa.....	10	286	0.5	19	464,285	0.6	18	284,486	0.5	20	22.2	.....	-66.7	86.3	.....	-68.7	47.9	.....	-74.5
Colorado.....	6	214	0.4	21	435,822	0.6	19	327,551	0.6	18	-42.8	-55.6	27.3	-24.0	-44.6	37.1	-20.6	-33.2	18.9
Kansas.....	4	228	0.4	20	378,175	0.5	20	303,822	0.8	19	74.0	.....	108.8	.....	.....	.....	111.1	.....	.....
Tennessee.....	6	323	0.6	17	327,610	0.4	21	218,080	0.4	21	7.7	8.8	-1.0	26.2	6.1	18.8	17.2	-5.2	23.7
Michigan.....	7	206	0.4	22	245,677	0.3	23	171,872	0.3	22	33.3	1.6	36.2	69.7	-15.2	100.0	59.3	-30.4	128.7
Utah.....	3	96	0.2	26	194,834	0.3	24	138,333	0.3	25	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Carolina.....	17	148	0.3	25	146,774	0.2	27	101,797	0.2	27	.....	.....	-39.1	.....	38.7	.....	.....	.....	.....
Virginia.....	4	68	0.1	28	51,686	0.1	30	33,008	0.1	32	-32.0	.....	-19.0	.....	.....	.....	.....	.....	.....
Dist. of Columbia.....	4	49	0.1	29	44,425	0.1	31	36,037	0.1	30	-55.0	-55.9	1.8	-62.4	-60.4	-5.1	.....	.....	.....
Arkansas.....	5	45	0.1	31	41,624	(²)	32	83,187	0.1	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisiana.....	4	26	(²)	34	34,642	(²)	34	23,490	(²)	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina.....	4	36	0.1	32	28,347	(²)	35	20,081	(²)	35	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin.....	3	9	(²)	36	9,109	(²)	38	7,991	(²)	38	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states.....	24	958	1.7	.....	1,638,978	2.2	.....	1,177,217	2.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 32. A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners or less than \$100,000 for value of products or value added by manufacture.
² Less than one-tenth of 1 per cent.

Of the 10 leading states in the pottery, terra-cotta, and fire-clay products industry, as measured by value of products, Missouri showed the largest relative increase during the decade 1899-1909, 144.8 per cent, and California showed the largest relative increase in the number of wage earners, 162.7 per cent.

A few of the less important states advanced notably in rank in the industry, as measured by value of products, from 1904 to 1909—Texas, from eighteenth to fifteenth; Alabama, from twenty-first to sixteenth; Iowa, from twenty-seventh to eighteenth; Arkansas, from thirty-fifth to thirty-second; and Utah, from twenty-ninth to twenty-fourth. Colorado dropped from twelfth to nineteenth; Tennessee, from nineteenth to twenty-first; Michigan, from twentieth to twenty-third; and the District of Columbia, from twenty-fifth to thirty-first.

Persons engaged in the industry.—Table 20 shows, for 1909, the number of persons engaged in the manufacture of pottery, terra-cotta, and fire-clay products, classified according to occupational status and sex, and in the case of wage earners, according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

CLASS.	PERSONS ENGAGED IN THE MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS: 1909		
	Total.	Male.	Female.
All classes.....	61,022	53,932	7,090
Proprietors and officials.....	2,166	2,122	44
Proprietors and firm members.....	452	420	32
Salaried officers of corporations.....	692	683	9
Superintendents and managers.....	1,022	1,019	3
Clerks.....	2,688	2,078	610
Wage earners (average number).....	56,168	49,732	6,436
16 years of age and over.....	55,352	49,075	6,277
Under 16 years of age.....	816	657	159

The average number of persons engaged in the pottery, terra-cotta, and fire-clay products industry during 1909 was 61,022, of whom 56,168, or 92 per cent, were wage earners; 2,166, or 3.5 per cent, proprietors and officials; and 2,688, or 4.4 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 53,932, or 88.4 per cent, were males and 7,090, or 11.6 per cent, females. The average number of children under 16 years of age employed as wage earners was 816.

The average number of wage earners for each state, as reported at the censuses of 1909, 1904, and 1899, is given in Table 32. The distribution of the average number by sex and age is not shown for the individual states, but Table 33 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported

in 16 of the 29 states for which separate figures are shown. The largest number of such wage earners, 3,366, was reported for the state of Ohio, and the next largest number, 1,219, for New Jersey. The comparatively few wage earners under 16 years of age were fairly well distributed among the states, the largest number, 304, being reported for Pennsylvania.

In order to compare the distribution of persons engaged in this industry in 1909 according to occupational status with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 21.

CLASS.	PERSONS ENGAGED IN THE MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.				Percent of increase: ¹ 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total.....	61,022	100.0	56,730	100.0	7.6
Proprietors and firm members.....	452	0.7	550	1.0	-17.8
Salaried employees.....	4,402	7.2	3,752	6.6	17.3
Wage earners (average number).....	56,168	92.0	52,428	92.4	7.1

¹ A minus sign (-) denotes decrease.

Proprietors and firm members decreased from 1904 to 1909, while salaried employees and wage earners both increased, the relative gain being the greater in the case of salaried employees. Wage earners formed a slightly smaller proportion of the total number of persons engaged in the industry in 1909 than in 1904.

Table 22 shows the average number of wage earners in the pottery, terra-cotta, and fire-clay products industry distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS EMPLOYED IN THE MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.					
	1909		1904		1899	
	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.	Num-ber.	Per cent distribution.
Total.....	56,168	100.0	62,428	100.0	43,714	100.0
16 years of age and over.....	55,352	98.5	51,295	97.8	42,652	97.6
Male.....	49,075	87.4	45,342	86.5	38,171	87.3
Female.....	6,277	11.2	5,953	11.4	4,481	10.3
Under 16 years of age.....	816	1.5	1,133	2.2	1,062	2.4

The proportion of men and women employed did not change greatly between the three censuses, but there was a constant decrease in the proportion of children employed.

Wage earners employed, by months.—Table 23 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for the 12 states in which an average of 500 or more wage earners were employed during the year.

Table 23

WAGE EARNERS EMPLOYED IN THE MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS: 1909¹

STATE.	Average number during the year	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		United States	58,168	50,383	52,284	54,419	55,088	55,508	56,094	56,485	57,715	58,299	59,200	59,355	59,202
California.....	1,027	<i>879</i>	912	918	978	1,031	1,075	1,081	1,120	1,092	1,067	1,096	1,077
Georgia.....	592	590	551	550	537	600	592	620	612	621	629	613	588
Illinois.....	3,157	<i>2,652</i>	2,686	3,003	3,208	3,233	2,784	3,271	3,288	3,447	3,628	3,488	3,399
Indiana.....	2,186	2,058	<i>2,045</i>	2,147	2,118	2,122	2,128	2,150	2,229	2,242	2,295	2,345	2,353
Kentucky.....	1,319	1,224	<i>1,221</i>	1,305	1,287	1,233	1,311	1,323	1,360	1,380	1,384	1,395	1,411
Maryland.....	720	<i>651</i>	729	730	696	734	724	700	724	738	746	747	720
Missouri.....	3,138	<i>2,653</i>	2,728	2,990	3,035	3,050	3,011	3,137	3,215	3,316	3,397	3,560	3,566
New Jersey.....	9,815	<i>8,340</i>	8,998	9,271	9,565	9,668	9,977	10,012	10,070	10,113	10,334	10,507	10,425
New York.....	2,367	<i>2,105</i>	2,310	2,318	2,350	2,361	2,340	2,429	2,424	2,368	2,381	2,475	2,547
Ohio.....	16,519	<i>15,197</i>	16,056	16,568	16,568	16,657	16,796	16,056	16,772	16,772	17,044	16,935	16,899
Pennsylvania.....	9,003	<i>8,080</i>	8,464	8,540	8,489	8,553	8,929	9,228	9,367	9,555	9,600	9,583	9,638
West Virginia.....	2,034	<i>1,769</i>	1,803	1,961	1,991	1,976	1,986	2,018	2,127	2,147	2,190	2,205	2,235

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The manufacture of pottery, terra-cotta, and fire-clay products is very little subject to seasonal variations, the clay for pottery and kindred products being stored during the seasonable months for use during the cold or wet seasons of the year. The largest number of wage earners employed during any month of 1909 was 59,355, in November, and the smallest number, 50,383, in January, the minimum number being equal to 84.9 per cent of the maximum. In 1904 the maximum number of wage earners employed in the industry was reported for September, and the minimum number, which was equal to 86.6 per cent of the maximum, was reported for January.

Prevailing hours of labor.—In Table 24 the wage earners in the pottery industry have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

Over three-fourths (75.8 per cent) of the wage earners employed in 1909 were in establishments where the prevailing number of hours was from 54 to 60 per week, inclusive, and only 2.5 per cent were employed in establishments where they were more than 60 per week. Of the seven groups shown in the table, by far the largest was that made up of the wage earners in establishments where the prevailing hours were 60 per week, such wage earners constituting 39.1 per cent of the total number. This group was the most important in six of the individual states for which figures are given. In Missouri, New Jersey, and New York, however, the wage earners in establishments where the prevailing hours per week were between 54 and 60 formed the largest group, and in Maryland and West Virginia the greatest number were employed in establishments which reported 48 hours and under per week as the prevailing hours of labor.

Table 24

AVERAGE NUMBER OF WAGE EARNERS EMPLOYED IN THE MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRECLAY PRODUCTS: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
		United States	56,168	6,488	5,709	10,071	10,590	21,909	967	434
California.....	1,027	18	.....	660	.....	250	99	.....
Georgia.....	592	3	.....	87	.....	270	232	.....
Illinois.....	3,157	613	2	141	1,185	1,216	.....	.....
Indiana.....	2,186	142	.....	512	560	972	.....	.....
Kentucky.....	1,319	378	.....	68	299	574	.....	.....
Maryland.....	720	337	.....	101	20	262	.....	.....
Missouri.....	3,138	65	.....	241	1,706	1,126	.....	.....
New Jersey.....	9,815	652	1,968	1,448	3,028	2,719	.....	.....
New York.....	2,367	234	423	570	617	451	.....	72
Ohio.....	16,519	2,143	2,660	3,838	1,058	6,703	117	.....
Pennsylvania.....	9,003	579	404	1,739	1,464	4,389	66	382
West Virginia.....	2,034	1,201	217	420	33	163	.....	.....

Character of ownership.—Table 25 presents statistics with respect to the character of ownership of establishments in the industry in 1909 and 1904.

Table 25

MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.

CHARACTER OF OWNERSHIP.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
	Total	822	873	\$76,118,881	$84,200,792
Individual.....	190	193	2,978,895	3,144,655
Firm.....	96	134	3,127,978	3,140,485
Corporation.....	536	546	70,011,988	57,915,652
Per cent of total	100.0	100.0	100.0	100.0
Individual.....	23.1	22.1	3.9	4.9
Firm.....	11.7	15.3	4.1	4.9
Corporation.....	65.2	62.5	92.0	90.2

In 1909, of the total number of establishments, 65.2 per cent were under corporate ownership, as compared with 62.5 per cent in 1904. While corporations thus controlled a little more than three-fifths of the total number of establishments at both censuses, the value of the products of these establishments represented 92 per cent of the total value of products for the industry in 1909, and 90.2 per cent in 1904.

Table 26 gives statistics for establishments in the pottery, terra-cotta, and fire-clay products industry classified according to form of ownership, for the 12 states in which an average of 500 or more wage earners were employed in 1909.

In 1909, 2,295 wage earners, or 4.1 per cent of the total number, were employed in establishments under individual ownership; 2,447, or 4.4 per cent, in those under firm ownership; and 51,426, or 91.6 per cent, in those owned by corporations.

Table 26

MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS: 1909

STATE.	Number of establishments owned by—			Wage earners in establishments owned by—			Value of products of establishments owned by—			Value added by manufacture in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	190	80	538	2,295	2,447	51,426	\$2,978,895	\$3,127,878	\$70,011,988	\$2,201,860	\$2,217,180	\$49,788,918
California.....	7	2	17	47	(X)	980	<i>185,250</i>	(X)	1,671,879	<i>86,324</i>	(X)	1,205,610
Georgia.....	17	2	8	24		568	<i>88,166</i>	(X)	585,713	<i>23,837</i>	(X)	438,886
Illinois.....	9	5	25	15	99	3,043	21,296	164,904	4,428,528	16,192	108,993	3,363,097
Indiana.....	4	5	22	66	64	2,058	65,110	98,438	2,802,220	46,629	71,314	1,988,801
Kentucky.....	5	1	13	17	(X)	1,302	<i>17,864</i>	(X)	1,451,893	<i>16,018</i>	(X)	1,072,387
Maryland.....	2	4	10	(X)	77	643	(X)	<i>74,888</i>	682,507	(X)	<i>64,494</i>	496,189
Missouri.....	9	1	19	408	(X)	2,736	<i>606,886</i>	(X)	3,461,816	<i>415,980</i>	(X)	2,678,812
New Jersey.....	18	9	63	179	688	9,048	218,130	705,289	12,215,581	159,138	503,714	8,924,980
New York.....	11	4	24	285	32	2,050	351,379	35,450	2,988,667	276,318	28,674	2,223,832
Ohio.....	17	18	151	735	316	15,468	859,738	472,323	19,840,713	669,217	345,803	13,896,772
Pennsylvania.....	22	22	95	231	895	7,877	323,139	1,135,332	11,613,635	239,296	785,962	7,937,480
West Virginia.....	1	1	14	(X)	(X)	<i>2,084</i>	(X)	(X)	<i>2,678,673</i>	(X)	(X)	<i>1,893,026</i>

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted, and the figures for the group with which they have been combined are printed in italics.

Size of establishments.—Table 27 presents statistics for 1909 and 1904 for establishments in the pottery, terra-cotta, and fire-clay products industry, grouped according to the value of their products.

Table 27

MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.

VALUE OF PRODUCTS PER ESTABLISHMENT.	Number of establishments.		Value of products.	
	1909	1904	1909	1904
	Total.....	822	873	\$76,118,861	$64,200,792
Less than \$5,000.....	176	166	362,030	383,167
\$5,000 and less than \$20,000.....	123	179	1,445,678	1,984,046
\$20,000 and less than \$100,000.....	291	321	15,653,399	16,825,169
\$100,000 and less than \$1,000,000..	229	207	54,870,795	45,203,410
\$1,000,000 and over.....	3		3,786,959	
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	21.4	19.0	0.5	0.6
\$5,000 and less than \$20,000.....	15.0	20.5	1.9	3.1
\$20,000 and less than \$100,000.....	35.4	36.8	20.6	25.9
\$100,000 and less than \$1,000,000..	27.9	23.7	72.1	70.4
\$1,000,000 and over.....	0.2		5.0	

In 1909 only three establishments manufactured products valued at \$1,000,000 or over. In 1904 there were no establishments of this class reported. Establishments manufacturing products valued at \$100,000 but less than \$1,000,000 formed the most important

class at both censuses, reporting 72.1 per cent of the total value of products in 1909 and 70.4 per cent in 1904.

The average value of products per establishment increased from \$73,540 in 1904 to \$92,602 in 1909, and the average value added by manufacture, as computed from the figures in Table 18, from \$54,535 to \$65,946. The average number of wage earners per establishment, likewise, shows an increase from 60 in 1904 to 68 in 1909.

Table 28 classifies the establishments in the pottery industry in 12 of the leading states according to the number of wage earners employed.

Of the 822 establishments reported in 1909, 4.1 per cent employed no wage earners; 35.2 per cent employed from 1 to 20; 39.5 per cent, from 21 to 100; 16.7 per cent, from 101 to 250; and 4.5 per cent, more than 250 each. There were but 8 establishments that employed more than 500 wage earners.

Of the total number of wage earners, 3.7 per cent were reported by establishments employing from 1 to 20, 29.9 per cent by establishments employing 21 to 100, and 66.4 per cent by establishments employing more than 100 wage earners each.

Table 28

MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS: 1909

STATE.	Establishments employing—																			
	Total.		No wage earners.		1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.	
	Es-tab-lish-ments.	Wage earners (average number).	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.	Es-tab-lish-ments.	Wage earners.
United States..	822	56,168	34	155	380	134	1,707	178	8,139	147	10,648	137	22,010	28	9,522	7	4,755	1	1,029	
California.....	26	1,027	3	5	13	10	125	2	81	3	191	2	217	1	400					
Georgia.....	27	592	7	11	18	2	23	2	68	4	331	1	152							
Illinois.....	39	3,157		10	16	7	96	8	315	6	412	7	1,289					1	1,029	
Indiana.....	31	2,186		7	21	3	50	5	172	10	683	3	435	3	825					
Kentucky.....	19	1,319				1	16	9	133	4	283	4	578	1	299					
Maryland.....	16	720		4	8	4	38	3	115	2	115	3	444							
Missouri.....	29	3,138		7	13	2	20	3	122	6	438	7	1,007	3	832	1	706			
New Jersey.....	88	9,815	1	9	18	14	168	18	601	13	967	23	3,869	8	2,820	2	1,372			
New York.....	39	2,367	3	7	18	6	78	13	468	4	305	4	730	2	768					
Ohio.....	186	16,519	2	15	34	18	221	53	1,904	43	3,086	45	7,145	7	2,302	3	1,827			
Pennsylvania.....	139	9,003	4	19	53	25	353	33	1,137	29	2,123	25	4,061	4	1,276					
West Virginia.....	16	2,034		1	2	3	41	2	70	5	370	4	701			1	850			

Expenses.—As stated in the Introduction, the census figures for expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in the pottery industry in 1909 to have been \$65,655,579, distributed as follows: Cost of materials, \$21,910,905, or 33.4 per cent; wages, \$29,753,495, or 45.3 per cent; salaries, \$5,813,230, or 8.9 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$8,177,949, or 12.5 per cent. As may be seen by comparing the items in Table 33, the proportions of the total represented by the different classes of expenses vary somewhat in the several states, the difference being due in a measure to the differences in character of the products manufactured. Of the total expenses in 1909, the cost of materials represented only 33.4 per cent, this exceptionally small proportion being due, as in the case of the brick and tile industry, mainly to the low cost of clay, the principal material used. Of the total cost of materials, as shown in Table 33, over one-third (34.5 per cent) was expended for fuel and rent of power.

Engines and power.—The amount of power used in the manufacture of pottery, terra-cotta, and fire-clay products was first returned at the census of 1869, for which year a total of 2,148 horsepower was reported. Table 29 shows statistics of power used as reported at the censuses of 1909, 1904, and 1899.

The total primary power used in the pottery industry increased from 75,802 horsepower in 1899 to 110,017 horsepower in 1909, or 45.1 per cent during the decade. The power generated by steam engines

constituted all but a small proportion of the total horsepower reported, 92.7 per cent in 1909, as compared with 94.4 per cent in 1904 and 97.4 per cent in 1899. There was a marked increase in the power of gas and other internal-combustion engines and of electric motors operated by purchased current (rented electric power), and a decrease in the amount of water power used in the industry.

Table 29

MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.

POWER.	Number of engines or motors.			Horsepower.			Per cent distribution of horsepower.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
	Primary power, total.....	1,408	1,251	1,108	110,017	104,918	75,802	100.0	100.0	100.0
Owned.....	1,161	1,177	1,108	106,463	102,718	75,802	96.8	97.9	100.0
Steam.....	1,037	1,082	1,058	101,965	99,086	73,848	92.7	94.4	97.4
Gas.....	120	91	23	4,353	3,165	604	4.0	3.0	0.8
Water wheels.....	3	4	11	85	355	773	0.1	0.3	1.0
Water motors.....	1		(¹)	10		(¹)	(²)	(²)	
Other.....			16	50	112	577	(²)	0.1	0.8
Rented.....	247	74	(¹)	3,554	2,200	.....	3.2	2.1	.....
Electric.....	247	74	(¹)	3,544	1,847	.....	3.2	1.8	.....
Other.....				10	353	.....	(²)	0.3	.....
Electric motors.....	693	285	78	10,643	4,884	1,892	100.0	100.0	100.0
Run by current generated by establishment.....	446	191	78	7,099	2,837	1,892	66.7	60.6	100.0
Run by rented power.....	247	74	(¹)	3,544	1,847	.....	33.3	39.4	.....

¹ Not reported.² Less than one-tenth of 1 per cent.

The number and horsepower of electric motors used for distributing power by means of current generated in the establishments themselves also show a decided increase.

Table 30 shows for 1909 the amount of each of the several kinds of power and of the different kinds of fuel used in the pottery industry in each of the 12 leading states.

Table 30 MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS: 1909

STATE.	Primary horsepower.		Electric horsepower.		Fuel used.												
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.				Rented.		Total rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).	
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.			Other.	Anthracite (long tons).					Bituminous (short tons).
United States	703	110,017	106,463	101,965	4,353	96	50	3,544	10	10,643	7,099	96,348	3,026,646	4,562	36,743	370,234	10,365,943
California	21	2,856	2,211	2,167	44			645		945	300				309	200,347	
Georgia	8	1,540	1,540	1,540											6,325		
Illinois	29	7,996	7,345	7,290	15		40	650		770	120				903	36,031	
Indiana	29	6,089	4,964	4,962	2			125		297	172	1			55		40,000
Kentucky	15	3,554	3,429	3,417	12			125		180	35			1,906	470	4	5,400
Maryland	13	1,336	1,324	1,318	6			2	10	2		8			28	198	53
Missouri	26	7,848	7,715	7,657	58			133		1,334	1,201				30	307	6,091
New Jersey	83	11,817	11,501	11,427	74			316		2,476	2,160	80,785		1,142	1,238	708	126
New York	35	4,039	3,958	3,538	420			81		602	521	6,580		586	501	30,230	30,503
Ohio	182	26,778	26,534	24,334	2,200			244		2,049	1,805	1,286			388	2,670	7,369,525
Pennsylvania	129	23,142	22,622	21,523	1,014	85		520		916	398	8,643		416	701	142	1,432,335
West Virginia	16	1,674	1,521	1,403	118			153		153							1,279,930
All other states	117	12,349	11,799	11,389	390	10	10	560		937	367	1,045		455	28,348	94,063	207,414

In 1909 Ohio, Pennsylvania, and New Jersey together reported 61,737 horsepower, or 56.1 per cent of the aggregate for the industry. Steam was the most important power in all of the states. The largest amount of steam power is shown for Ohio, and the next largest for Pennsylvania. The largest amount of rented electric power is shown for Illinois, and the largest amount of power generated by gas and other internal-combustion engines, for Ohio.

Fuel consumed.—Bituminous coal was the principal kind of fuel used in 1909, the largest amount being reported by Ohio, which state also reported the largest amount of gas. The largest quantity of anthracite coal, or more than four-fifths of the total for the country, was reported for New Jersey, and by far the largest amount of oil by California.

Centralization of the manufacture of pottery.—The manufacture of pottery in New Jersey is largely centralized in the city of Trenton and that of Ohio in East Liverpool. Table 31 shows the production of pottery products in these cities in 1909 and 1899. The figures for 1909 are taken from "Mineral Resources of the United States," United States Geological Survey.

The two cities covered by the table reported 41 per

cent of the total value of pottery products for the United States in 1909, and 51.6 per cent in 1899. The increase in the value of pottery products in Trenton during the decade 1899-1909 was 50 per cent, as compared with 34.9 per cent for East Liverpool. The products of the industry in the two cities are somewhat different, since sanitary ware, which formed the chief product in Trenton, was not reported for East Liverpool, while the pottery products in the latter city were practically confined to white ware, C. C. ware, etc.

Table 31 MANUFACTURE OF POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS.

PRODUCT.	Trenton, N. J.		East Liverpool, Ohio.	
	1909	1899	1909	1899
	Total	\$7,175,801	\$4,785,142	\$5,538,870	$4,105,200
Stoneware and yellow and Rockingham ware			89,803	98,034
White ware, C. C. ware, white granite, semiporcelain ware, and semivitreous porcelain ware	1,242,361	1,565,357	4,578,390	3,529,664
China, bone china, delft, and belleek ware	1,082,398	536,870		197,144
Sanitary ware	3,944,597	1,942,332		
Porcelain electrical supplies	807,491	154,807	712,461	142,447
All other pottery products	98,954	585,776	158,216	137,911

¹ Figures do not agree with those shown for the city in Vol. IX of Thirteenth Census Reports, because the census of manufactures excluded statistics for certain establishments which were taken by the Geological Survey.

DETAILED STATE TABLES.

The principal data secured by the census inquiry concerning the manufacture of pottery, terra-cotta, and fire-clay products are presented in Tables 32 and 33.

Table 32 shows for 1909, 1904, and 1899 the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture for the United States and for individual states. Table 33 gives more detailed statistics for the industry for 1909.

POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Expressed in thousands.													
United States.....	1909	822	61,022	452	4,402	58,168	110,017	\$141,350	\$5,813	\$29,753	\$21,911	\$76,119	\$54,208
	1904	873	56,730	550	3,752	52,428	104,918	110,926	4,828	25,178	16,591	64,201	47,610
	1899	1,000	47,436	844	2,777	43,714	75,602	65,852	3,012	17,602	11,915	44,263	32,348
Alabama.....	1909	21	473	19	34	425	1,193	1,016	46	144	170	559	389
	1904	16	305	19	21	265	805	445	20	87	78	273	195
	1899	21	270	28	15	227	425	200	8	67	60	225	165
Arkansas.....	1909	5	54	6	3	45	31	50	2	17	8	42	34
	1904	3	25	3	3	22	25	24	.....	8	4	20	16
	1899	10	108	10	4	92	135	78	5	27	12	60	48
California.....	1909	26	1,167	12	128	1,027	2,856	3,545	184	641	505	1,797	1,292
	1904	22	941	10	71	860	2,195	3,484	99	555	396	1,761	1,265
	1899	18	448	16	41	391	1,084	1,307	59	246	261	751	490
Colorado.....	1909	6	231	3	14	214	450	1,079	28	143	108	436	328
	1904	11	511	4	31	476	2,108	832	51	268	296	787	491
	1899	10	423	7	42	374	1,005	856	60	216	161	574	413
District of Columbia.....	1909	4	57	4	4	49	200	49	4	20	8	44	36
	1904	6	129	10	8	111	295	343	5	51	22	111	89
	1899	6	122	8	6	109	327	256	6	38	28	117	89
Georgia.....	1909	27	659	21	46	592	1,540	932	58	294	153	614	461
	1904	21	645	19	37	592	2,055	891	48	166	144	480	356
	1899	21	329	23	21	285	416	267	18	67	42	206	164
Illinois.....	1909	39	3,474	23	294	3,157	7,995	14,901	383	1,885	1,126	4,615	3,489
	1904	45	2,710	34	260	2,416	6,915	6,606	329	1,244	732	3,256	2,524
	1899	53	2,199	41	153	2,005	4,980	3,512	201	841	576	2,144	1,568
Indiana.....	1909	31	2,373	16	171	2,186	5,089	4,806	213	1,190	859	2,966	2,107
	1904	38	2,200	35	146	2,019	5,387	3,837	183	931	646	2,643	1,997
	1899	49	1,850	40	60	1,250	2,621	1,626	60	531	312	1,291	979
Iowa.....	1909	10	322	5	31	266	1,147	792	36	173	180	464	284
	1904	7	94	9	7	73	280	137	8	41	29	78	49
	1899	17	264	17	13	234	764	361	13	93	57	249	192
Kansas.....	1909	4	259	.....	31	223	715	455	49	135	74	378	304
	1904	4	146	.....	15	131	560	235	18	56	37	181	144
	1899	3	26	3	1	22	112	20	1	12	6	29	23
Kentucky.....	1909	19	1,429	7	103	1,319	3,554	2,340	114	538	382	1,470	1,088
	1904	21	1,406	14	80	1,312	2,799	1,518	92	456	347	1,247	900
	1899	16	999	11	47	841	1,676	699	45	233	199	724	525
Louisiana.....	1909	4	33	6	1	26	40	66	1	9	11	35	24
	1904	5	44	7	1	36	101	45	1	12	8	31	23
	1899	3	25	4	1	20	15	11	1	6	6	22	16
Maryland.....	1909	16	799	12	67	720	1,336	973	71	316	296	767	551
	1904	16	997	14	58	925	1,484	1,148	55	399	138	852	714
	1899	18	1,144	15	47	1,082	663	1,081	44	385	196	835	639
Massachusetts.....	1909	20	541	9	67	465	932	1,167	76	256	179	644	465
	1904	25	644	22	55	567	1,216	1,592	61	294	175	718	543
	1899	29	682	26	72	584	1,209	1,628	60	262	188	713	525
Michigan.....	1909	7	230	7	17	206	426	325	14	89	74	246	172
	1904	6	222	4	15	203	372	117	10	101	43	290	247
	1899	9	170	5	16	149	633	280	13	51	37	145	108
Missouri.....	1909	29	3,437	11	288	3,138	7,846	13,247	405	1,554	1,076	4,069	2,993
	1904	38	2,728	18	178	2,532	6,089	5,378	251	1,246	752	3,083	2,331
	1899	37	1,757	27	123	1,607	2,805	2,952	162	643	370	1,662	1,292
New Jersey.....	1909	88	10,542	38	689	9,815	11,817	22,349	1,036	5,681	3,551	13,139	9,588
	1904	90	10,177	42	648	9,487	13,463	21,047	843	4,722	2,956	11,717	8,761
	1899	81	8,648	67	464	8,117	8,980	15,325	634	3,841	2,384	8,941	6,557
New York.....	1909	39	2,628	19	242	2,387	4,039	5,343	369	1,296	875	3,403	2,528
	1904	43	2,979	28	266	2,695	4,212	5,111	328	1,333	873	3,289	2,417
	1899	52	2,489	43	176	2,270	5,558	4,103	200	873	522	2,389	1,867
North Carolina.....	1909	17	173	19	6	148	770	184	13	42	45	147	102
	1904	6	97	7	6	84	325	91	12	20	26	106	80
	1899	21	169	24	7	138	293	83	5	24	27	84	57

POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899—Continued.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
Ohio.....	1909	186	17,751	69	1,163	16,519	26,778	\$32,167	\$1,443	\$8,623	\$6,461	\$21,173	\$14,712
	1904	205	17,072	106	1,047	15,919	24,754	26,360	1,177	7,677	4,823	18,551	13,728
	1899	248	12,913	225	818	11,870	20,051	15,564	766	5,001	3,229	11,851	8,622
Pennsylvania.....	1909	139	9,784	99	682	9,003	23,142	27,225	856	4,357	4,109	13,072	8,963
	1904	158	9,375	87	619	8,669	23,476	25,707	738	3,979	2,909	10,769	7,850
	1899	143	9,512	172	468	8,872	16,057	11,309	451	3,007	2,452	8,127	5,675
South Carolina.....	1909	4	42	3	3	36	304	61	4	9	8	28	20
	1904	6	98	4	6	88	425	97	5	20	14	41	27
	1899	10	60	12	2	46	114	26	1	10	5	23	18
Tennessee.....	1909	6	354	3	28	323	678	357	32	126	110	328	218
	1904	8	318	7	14	297	536	186	19	123	79	309	230
	1899	18	330	15	15	300	577	172	12	91	74	260	186
Texas.....	1909	17	475	12	43	420	923	795	46	183	195	597	402
	1904	22	253	24	11	218	500	178	10	91	70	327	257
	1899	28	318	31	7	280	370	203	7	77	44	192	148
Utah.....	1909	3	105	1	8	96	267	236	9	55	57	195	138
	1904	6	42	3	5	34	175	91	6	20	29	77	48
	1899	7	46	8	2	36	150	38	2	11	6	29	23
Virginia.....	1909	4	76	4	4	68	158	94	4	20	19	52	33
	1904	3	91	4	6	81	235	121	5	17	30	77	47
	1899	5	116	6	10	100	395	309	13	24	34	83	49
Washington.....	1909	8	321	1	31	289	1,263	1,023	39	197	112	523	411
	1904	6	182	1	19	162	1,179	987	26	114	121	416	295
	1899	8	149	8	15	126	155	437	18	60	29	157	128
West Virginia.....	1909	16	2,149	6	109	2,034	1,674	2,921	160	1,256	786	2,679	1,893
	1904	17	1,846	5	71	1,270	1,974	2,267	135	634	346	1,286	940
	1899	14	1,339	13	57	1,269	1,837	1,610	52	500	219	1,106	886
Wisconsin.....	1909	3	12	2	1	9	33	22	1	4	1	9	8
	1904	4	17	2	3	12	70	25	3	5	3	15	12
	1899	4	19	9	.....	10	45	23	.....	4	1	14	13
All other states.....	1909	24	1,067	15	94	958	2,819	2,840	124	574	463	1,638	1,175
	1904	20	933	8	68	867	1,910	2,024	90	463	466	1,420	954
	1899	41	1,113	30	75	1,008	2,450	1,716	95	446	378	1,261	883

POTTERY, TERRA-COTTA, AND FIRE-CLAY PRODUCTS—DETAILED STATISTICS, BY STATES: 1909.

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.							WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.	
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.		Female.
								Maximum month.	Minimum month.						
United States..	822	61,022	452	1,714	2,078	610	58,168	No 59,355	Ja 50,383	60,842	53,159	8,799	712	172	110,017
Alabama.....	21	478	19	18	14	2	425	Oc 583	My 333	565	540		25		1,193
Arkansas.....	5	54	6	2	1		45	Mh 49	De 39	49	40		9		31
California.....	28	1,167	12	46	71	11	1,027	Au 1,120	Ja 879	1,133	1,124	6	3		2,856
Colorado.....	6	231	3	7	2	5	214	Jy 267	Ja 181	228	222	4	2		450
District of Columbia.....	4	57	4	4			49	Ap 57	Oc 42	48	48				200
Georgia.....	27	659	21	20	18	8	592	Oc 629	Ap 537	640	632		8		1,540
Illinois.....	39	3,474	23	79	183	32	3,157	Oc 3,528	Ja 2,552	3,431	3,385	42	4		7,995
Indiana.....	31	2,373	16	71	76	25	2,186	De 2,543	Fe 2,045	2,422	2,030	353	25	14	5,089
Iowa.....	10	322	5	14	15	2	286	Au 337	Ja 216	257	255		2		1,147
Kansas.....	4	259		13	14	4	228	Se 269	Ja 155	251	250		1		715
Kentucky.....	19	1,429	7	44	49	10	1,319	De 1,411	Fe 1,221	1,413	1,334	70	9		3,554
Louisiana.....	4	33	6	1			28	Fe 1 27	Ja 1 26	26	21		5		40
Maryland.....	18	799	12	35	27	5	720	No 747	Ja 654	724	565	92	61	6	1,336
Massachusetts.....	20	541	9	27	24	16	465	No 507	Fe 360	509	470	27	12		932
Michigan.....	7	230	7	10	5	2	206	My 225	No 190	197	196	1			426
Missouri.....	29	3,437	11	74	181	33	3,138	De 3,566	Ja 2,653	3,573	3,561	7	5		7,848
New Jersey.....	83	10,542	38	245	347	97	9,815	No 10,507	Ja 8,840	10,486	9,192	1,184	75	35	11,817
New York.....	39	2,628	19	102	101	39	2,367	Da 2,547	Ja 2,105	2,613	2,133	425	51	4	4,039
North Carolina.....	17	173	19	5	1		148	Au 174	Ja 104	143	133		10		770
Ohio.....	186	17,751	69	469	498	196	16,519	Oc 17,044	Ja 15,197	17,323	13,847	3,296	110	70	26,778
Pennsylvania.....	139	9,784	99	301	304	77	9,003	De 9,638	Ja 8,090	10,290	9,387	599	267	37	23,142
South Carolina.....	4	42	3	2	1		36	My 43	Ja 21	43	42		1		304
Tennessee.....	6	354	3	6	21	1	323	Je 333	De 311	319	319	2	3		678
Texas.....	17	475	12	12	29	2	420	Oc 469	Fe 388	440	434		1		923
Utah.....	3	105	1	4	3	1	96	No 100	My 89	99	99				267
Virginia.....	4	76	4	3	1		68	Je 87	Mh 49	81	58	17	6		158
Washington.....	8	321	1	18	10	3	289	Jy 329	Fe 202	292	292				1,263
West Virginia.....	16	2,149	6	46	40	23	2,034	De 2,235	Ja 1,769	2,245	1,600	624	15	6	1,674
Wisconsin.....	3	12	2	1			9	Ja 1 10	Je 7	10	9		1		33
All other states 2.....	24	1,067	15	35	43	16	958			992	941	50	1	1	2,819

STATE.	Capital.	EXPENSES.										Value added by manufacture (value of products less cost of materials).		
		Total.	Services.			Materials.			Miscellaneous.				Value of products.	
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.			
United States..	\$141,849,665	\$65,655,578	\$3,368,436	\$2,444,794	\$29,763,495	\$7,560,532	\$14,350,373	\$134,048	\$537,503	\$208,287	\$7,298,111	\$78,118,861	\$54,207,956	
Alabama.....	1,015,974	454,363	32,135	13,823	143,841	71,316	98,680		3,190		91,378	558,840	388,844	
Arkansas.....	60,043	32,023	1,600	100	17,162	5,839	2,598	56	78	300	4,290	41,624	33,187	
California.....	3,545,182	1,634,081	104,303	80,012	641,227	248,443	256,746	2,209	21,144	8,316	171,681	1,797,129	1,291,940	
Colorado.....	1,078,894	330,267	15,545	10,650	142,741	38,941	69,300	96	4,347		48,717	435,822	327,551	
District of Columbia.....	48,738	37,831	3,900		20,127	6,188	2,200	1,260	373	100	3,683	44,425	36,037	
Georgia.....	932,299	502,410	29,792	28,010	233,748	88,271	66,874	304	4,222	550	52,639	613,868	460,723	
Illinois.....	14,900,981	3,946,183	196,795	186,052	1,884,579	433,231	693,215	3,894	23,434	45,566	479,117	4,614,728	3,458,282	
Indiana.....	4,805,830	2,566,674	125,695	87,115	1,189,598	339,413	619,611	145	19,101	2,513	283,483	2,965,768	2,106,744	
Iowa.....	792,426	434,832	19,815	16,122	173,377	127,830	51,949		1,772		43,967	464,265	284,486	
Kansas.....	454,724	297,728	27,623	21,320	135,018	33,202	41,151		2,280		37,234	378,175	303,822	
Kentucky.....	2,339,729	1,252,597	64,646	49,840	538,161	152,811	229,547	433	10,036		207,123	1,469,757	1,087,399	
Louisiana.....	66,445	22,189	720		9,055	1,045	10,107	180	116		966	34,642	23,490	
Maryland.....	973,443	663,352	43,070	27,579	316,110	71,429	134,683	3,118	8,570	1,596	57,197	756,795	580,683	
Massachusetts.....	1,166,607	583,330	43,197	32,862	255,970	87,627	110,877	4,454	10,350	1,216	56,777	644,286	465,782	
Michigan.....	325,427	195,452	10,613	3,722	83,620	35,459	38,346		1,613		17,079	245,677	171,872	
Missouri.....	13,246,818	3,493,528	192,648	212,224	1,554,141	499,731	576,438	9,650	40,016	4,757	403,923	4,068,701	2,992,532	
New Jersey.....	22,348,615	11,349,870	627,917	407,846	5,861,153	1,171,823	2,379,342	14,972	76,337	17,385	993,092	13,139,000	9,587,832	
New York.....	5,342,721	2,946,384	219,819	139,390	1,295,514	271,101	603,571	22,997	32,653	5,722	355,817	3,403,496	2,528,824	
North Carolina.....	183,903	115,005	17,450	450	41,779	10,401	34,578		943	100	9,306	146,774	101,797	
Ohio.....	32,166,636	18,838,269	801,509	641,338	8,627,799	2,025,175	4,436,305	15,859	151,374	98,159	2,040,771	21,173,272	14,711,792	
Pennsylvania.....	27,225,268	10,811,423	535,732	320,614	4,357,336	1,149,042	2,960,326	39,406	84,916	15,897	1,348,154	13,072,106	8,962,738	
South Carolina.....	51,212	25,985	3,000	720	9,333	7,895	371		148		4,518	28,347	20,081	
Tennessee.....	356,887	291,059	14,280	17,680	126,338	67,680	41,850		2,772		20,459	327,610	218,080	
Texas.....	794,914	503,676	28,295	18,109	182,753	135,771	89,021	35	3,333	350	76,009	597,226	402,434	
Utah.....	236,093	138,900	6,580	2,570	55,757	25,341	31,160		1,983	6,385	10,304	194,834	138,333	
Virginia.....	94,397	43,760	2,920	650	20,175	7,425	11,155		210		1,225	61,586	33,006	
Washington.....	1,022,709	389,942	27,076	11,695	197,036	60,978	50,940		3,634		38,684	523,350	411,432	
West Virginia.....	2,921,058	2,421,294	92,585	87,429	1,265,844	167,810	617,838	4,830	10,619		204,339	2,678,673	1,893,025	
Wisconsin.....	22,222	8,178	1,040		3,525	507	611		192		2,303	9,109	7,991	
All other states 2.....	2,839,894	1,425,194	78,237	47,272	575,678	240,804	220,955	10,160	17,747	375	234,076	1,638,976	1,177,217	

¹ Same number reported for one or more other months.

² "All other states" embrace: Arizona, 1 establishment; Connecticut, 6; Maine, 2; Montana, 1; Minnesota, 4; Mississippi, 3; Nebraska, 1; New Hampshire, 2; New Mexico, 2; Oregon, 3.

SPECIAL STATISTICS RELATING TO PRODUCTS FOR THE CLAY PRODUCTS INDUSTRIES COMBINED.

Table 34 shows the value of products of the combined clay products industries in the United States for 1909, 1904, and 1899. In order to avoid a duplicate canvass, the United States Geological Survey, which annually collects statistics of the production of clay products, and the Bureau of the Census cooperated in collecting data for the year 1909. The figures relative to quantities and values of brick and tile, pottery, terra-cotta, and fire-clay products, therefore, agree in the reports of the two bureaus for 1909, with the exception that the census report includes among the clay products sand-lime brick, the manufacture of which is treated as a separate industry by the Geological Survey. The variations in the reports of the two bureaus for other census years may be attributed to differences in the methods employed.

PRODUCT.	CLAY PRODUCTS INDUSTRIES.		
	1909	1904	1899
Total value	\$168,895,365	\$135,352,854	\$96,633,862
Brick and tile, terra-cotta, and fire-clay products.....	\$136,387,846	\$109,003,306	\$76,551,645
Brick.....	\$97,137,844	\$78,728,083	\$58,640,228
Common—			
Thousands.....	9,787,671	8,683,897	7,654,528
Value.....	\$57,216,789	\$51,239,871	\$39,674,749
Fire—			
Thousands.....	838,167	678,362	800,862
Value.....	\$16,620,695	\$11,752,625	\$8,636,562
Vitrified, paving, etc.—			
Thousands.....	1,023,654	715,559	590,720
Value.....	\$11,269,586	\$7,256,088	\$4,828,456
Front, including fancy colored and fancy or ornamental—			
Thousands.....	821,641	626,142	451,420
Value.....	\$9,886,292	\$7,335,511	\$5,170,492
Sand lime.....	\$1,150,580	\$698,003	(²)
Enameled.....	\$993,902	\$445,985	\$329,969
Drain tile.....	\$9,798,978	\$5,522,198	\$3,662,184
Sewer pipe.....	\$10,322,324	\$8,416,009	\$4,560,334
Architectural terra cotta.....	\$8,251,625	\$3,792,763	\$2,027,532
Fireproofing, terra-cotta, lumber, and hollow building tile, or blocks.....	\$4,466,708	\$4,317,312	\$1,665,031
Tile, not drain.....	\$5,291,963	\$2,725,717	\$1,276,300
Stove lining.....	\$423,583	(²)	\$416,235
Other.....	\$2,694,821	\$5,501,224	\$4,303,801
Pottery.....	\$31,048,341	\$25,834,513	\$17,222,040
White ware, including C. C. ware, white granite, semiporcelain ware, and semivitreous porcelain ware.....	\$13,728,316	\$9,195,703	\$6,376,351
Sanitary ware.....	\$5,989,295	\$3,932,506	\$2,211,877
Stoneware and yellow and Rockingham ware.....	\$3,993,859	\$3,481,521	\$2,130,263
Porcelain electrical supplies.....	\$3,047,499	\$1,500,283	\$470,355
China, bone china, delft, and belleek ware.....	³ \$1,766,766	\$3,478,627	\$1,297,978
Red earthenware.....	\$804,806	\$821,695	\$762,260
Other.....	\$1,717,800	\$3,424,178	\$3,972,956
All other products.....	\$1,459,178	\$515,035	\$1,760,177

¹ In addition to the products included in this table, clay products to the value of \$637,391 in 1909 and to the value of \$299,452 in 1904 were manufactured by establishments assigned to other industries.

² Not reported separately.

³ Product of Ohio included in "other" pottery.

Of the total value of the clay products in 1909, the value of brick formed 58 per cent, that of tile and allied products 23.4 per cent, and of pottery products 18.5 per cent. The corresponding proportions in 1899 were 62.5 per cent, 19.1 per cent, and 18.4 per cent, respectively. Of the total value of brick, common brick represented 58.9 per cent in 1909, as compared with 67.7 per cent in 1899. On the other hand, the

proportions represented by fire, vitrified paving, and front brick were greater in 1909 than in 1899. The relative increase in quantity produced was much less than that in the value of the product, this fact being specially noticeable in the case of fire brick, which increased 92.4 per cent in value during the decade and only 4.7 per cent in quantity.

White ware, including C. C. ware, etc., the most important of the pottery products, represented 44.2 per cent of the total value of this class of products in 1909 and 37 per cent in 1899. The largest absolute increase in value of products during the decade, \$7,351,965, was the class of products just mentioned, but the largest relative gain was in porcelain electrical supplies. All of the specified pottery products show large percentages of increase in value for the decade, except red earthenware, for which class of products the increase was small.

Table 35 shows, by states, the quantity of common brick, fire brick, and vitrified paving brick for 1909, 1904, and 1899 and their value for 1909.

PRODUCT AND STATE.	PRINCIPAL PRODUCTS OF THE CLAY PRODUCTS INDUSTRIES.			
	1909		1904	1899
	Value.	Quantity (thousands).	Quantity (thousands).	Quantity (thousands).
Common brick	\$57,216,789	8,787,671	8,683,897	7,654,528
Alabama.....	799,693	146,180	134,305	107,436
California.....	1,749,209	276,396	262,108	129,492
Connecticut and Rhode Island.....	1,408,033	242,000	179,175	150,665
Georgia.....	1,469,839	275,809	247,978	201,551
Illinois.....	5,927,054	1,257,025	990,362	655,202
Indiana.....	1,579,185	251,227	308,133	363,282
Iowa.....	1,072,340	153,065	213,501	218,931
Kansas.....	1,160,877	254,890	215,651	76,605
Maryland.....	914,420	148,673	159,647	111,469
Massachusetts.....	1,177,281	183,584	177,971	230,437
Michigan.....	1,250,787	219,820	238,141	199,764
Minnesota.....	969,729	161,585	173,153	145,226
Missouri.....	1,961,805	276,403	250,385	250,385
Nebraska.....	946,532	139,151	132,000	118,952
New Jersey.....	2,609,605	460,966	303,117	394,654
New York.....	7,760,746	1,542,552	1,226,561	1,246,633
North Carolina.....	1,140,727	188,313	120,349	126,458
Ohio.....	2,429,879	420,999	462,656	465,986
Oklahoma ¹	952,453	156,889	64,797	22,958
Pennsylvania.....	5,607,490	872,658	809,154	780,327
Tennessee.....	1,022,282	159,328	150,522	112,520
Texas.....	1,890,601	293,660	198,141	173,000
Virginia.....	1,540,648	249,794	202,458	128,455
Washington.....	1,081,579	143,198	73,765	55,444
Wisconsin.....	956,232	147,741	220,607	178,497
Fire brick	16,620,695	838,167	678,362	800,862
Illinois.....	682,793	31,210	12,941	11,500
Kentucky.....	899,363	51,645	36,617	21,340
Missouri.....	1,598,302	78,678	38,334	26,602
New Jersey.....	907,276	35,454	31,057	40,281
Ohio.....	1,730,401	103,148	87,626	69,129
Pennsylvania.....	8,107,807	417,836	356,666	558,016
Vitrified paving brick or block	11,269,586	1,023,654	715,559	690,720
Illinois.....	1,582,373	140,105	110,617	88,047
Indiana.....	559,201	53,597	47,608	28,120
Kansas.....	932,419	103,264	90,162	40,635
Missouri.....	781,706	59,863	50,528	22,594
Ohio.....	3,113,128	324,530	189,734	145,657
Pennsylvania.....	1,329,317	118,735	91,646	89,017
West Virginia.....	565,218	45,661	42,122	65,451

¹ Includes Indian Territory.

Table 36 shows, by states, the value of the remaining clay products for 1909, 1904, and 1899.

Table 36 PRODUCT AND STATE.	VALUE OF THE PRINCIPAL PRODUCTS OF THE CLAY PRODUCTS INDUSTRIES.			PRODUCT AND STATE.	VALUE OF THE PRINCIPAL PRODUCTS OF THE CLAY PRODUCTS INDUSTRIES.		
	1909	1904	1899		1909	1904	1899
Front, including fancy colored and fancy or ornamental brick	\$9,886,292	\$7,336,511	25,170,492	Tile, not drain	\$5,291,943	\$2,725,717	\$1,275,300
California	1,309,770	315,988	76,173	California	130,941	25,250	3,400
Colorado	473,039	249,830	140,413	Illinois	335,020	241,563	130,085
Illinois	397,393	570,746	279,822	Kentucky	296,179	214,124	3,000
Indiana	1,511,171	222,579	148,819	New Jersey	992,606	245,518	37,123
Missouri	619,465	472,439	330,250	Ohio	1,912,345	938,630	565,094
New Jersey	870,823	737,554	653,187	Pennsylvania	441,243	215,688	61,036
Ohio	1,418,154	1,005,573	508,592	Stove lining	423,633	(²)	416,835
Pennsylvania	2,139,519	1,350,147	1,016,299	Maryland	25,925		32,457
Texas	1,407,023	71,991	62,968	Massachusetts	159,530		143,547
Utah	317,189	81,535	19,373	New York	79,653		74,507
Virginia	1,333,057	434,091	258,254	Ohio	23,803		7,563
				Pennsylvania	97,270		106,851
Sand-lime brick	1,160,680	698,003	(²)	White ware, including C. C. ware, white granite, semiporcelain ware, and semivitreous porcelain ware	13,728,318	9,195,703	6,378,361
California	30,056	35,425		New Jersey	1,242,361	1,290,768	1,566,148
Florida	77,076	36,100		Ohio	8,834,189	6,167,494	4,609,446
Indiana	32,800	57,000		Pennsylvania	812,338	547,798	200,757
Iowa	48,210			West Virginia	1,769,808	550,551	
Michigan	218,226	48,550		Sanitary ware	6,989,295	3,932,506	2,211,877
New Jersey	21,925	15,380		New Jersey	4,341,040	3,006,406	2,125,471
New York	90,402	18,100		Ohio	310,254	197,225	
Pennsylvania	62,255	68,786		Pennsylvania	252,951	88,058	41,727
				West Virginia	500,432	165,400	
Enameled brick	983,902	445,955	329,989	Stoneware and yellow and Rockingham ware	3,993,850	3,481,521	2,130,283
Drain tile	9,788,978	6,522,198	3,682,184	Illinois	702,411	750,821	672,076
Illinois	1,613,593	1,042,056	1,025,469	Kentucky	126,172	129,410	93,835
Indiana	2,018,401	1,235,585	833,347	Ohio	1,808,798	1,146,718	741,685
Iowa	2,330,910	1,299,766	359,258	Pennsylvania	297,029	336,423	174,450
Michigan	364,006	221,502	138,889	Texas	111,539	121,766	67,647
Ohio	2,032,528	1,174,290	968,483	Porcelain electrical supplies	3,047,499	1,600,283	470,855
Sewer pipe	10,322,324	9,416,009	4,560,334	New Jersey	823,056	328,524	154,807
California	904,473	679,804	479,537	New York	752,185	452,019	125,234
Georgia	351,492	174,000	100,612	Ohio	1,146,694	584,243	190,314
Illinois	394,461	391,453	229,040	Red earthenware	804,806	821,995	782,280
Indiana	332,449	257,618	161,935	California	42,464	24,133	24,474
Iowa	282,637	94,200	47,719	Illinois	31,771	16,850	52,300
Missouri	1,162,730	792,710	436,624	Massachusetts	154,887	181,771	163,231
Ohio	3,009,798	2,939,772	1,680,724	Michigan	60,939	20,600	29,641
Pennsylvania	445,594	809,374	204,400	New Jersey	36,573	30,634	24,000
Washington	737,847	214,720	76,694	New York	30,200	31,275	33,955
Architectural terra cotta	6,251,625	3,792,763	2,027,632	Ohio	145,137	183,236	164,798
California	345,402	223,000	76,000	Pennsylvania	159,796	136,532	99,786
Illinois	1,898,865	804,554	422,009	All other pottery products, including china, bone china, delft, and belleek ware	3,484,666	6,902,805	5,270,934
New Jersey	1,637,705	1,216,400	660,304				
New York	998,535	815,893	417,350				
Pennsylvania	428,522	341,077	139,100				
Washington	206,324	19,632	9,300				
Fireproofing, including terra-cotta lumber, etc.	4,486,708	4,317,312	1,665,031				
California	128,447	113,336	7,100				
Illinois	439,796	345,053	198,360				
Indiana	410,500	576,903	62,575				
Iowa	304,398	92,001					
Missouri	110,464	192,222	26,257				
New Jersey	1,299,540	1,279,121	653,144				
New York	199,999	267,680	108,926				
Ohio	804,637	917,176	346,090				

¹ Excluding the value of fancy or ornamental brick, separate figures for which are not available.

² Not reported.

³ Not reported separately.

GLASS

THE MANUFACTURE OF GLASS.

GENERAL STATISTICS.

Scope of the industry.—This industry, according to the census classification, embraces establishments manufacturing (1) building glass, which includes window glass, plate glass, and all varieties of cast and rolled glass; (2) pressed and blown glass, such as tableware, jelly cups, tumblers, goblets, lamps, chimneys, lantern globes, electric light bulbs and globes, opal ware, and cut glass; and (3) bottles, jars, demijohns, etc. Only establishments which make glass from the raw material, silica sand, are included. Establishments engaged primarily in glass beveling, bending sheet glass, engraving glass, making glass labels, and staining and ornamenting glass, and those which make cut glassware from purchased "blanks" are not included.

Comparison with earlier censuses.—Statistics for the glass industry in the United States first appeared in

the report of the census of manufactures of 1810, and data relating to the industry have been reported at every subsequent census.

At the census of 1849, 94 establishments were reported as engaged in the industry, these establishments giving employment to an average of 5,668 hands and manufacturing products valued at \$4,641,676. At the census of 1859, 112 establishments were reported, with an average of 9,016 hands and products valued at \$8,775,155.

Table 1 summarizes the statistics of establishments engaged in the manufacture of glass for each census from 1869 to 1909, inclusive. The financial figures for 1869 are given in currency, which at that time was worth only about 80 cents, gold, to the dollar. For strict comparison, therefore, these figures should be reduced about 20 per cent.

Table 1	NUMBER OR AMOUNT.						PER CENT OF INCREASE. ¹					
	1909	1904	1899	1889	1879	1869	1899-1909	1904-1909	1899-1904	1889-1899	1879-1889	1869-1879
Number of establishments.....	363	399	355	294	169	154	2.3	-9.0	12.4	20.7	74.0	-9.7
Persons engaged in the industry.....	72,573	67,105	55,256	(²)	(²)	(²)	31.3	8.1	21.4	.....	.....	.....
Proprietors and firm members.....	87	96	170	(²)	(²)	(²)	-48.8	-9.4	-43.5	.....	.....	.....
Salaried employees.....	3,575	3,040	2,268	(²)	(²)	(²)	57.6	17.6	34.0	.....	.....	.....
Wage earners (average number).....	68,911	63,969	52,818	44,892	24,177	15,367	30.5	7.7	21.1	17.7	(³)	(³)
Primary horsepower.....	123,132	91,476	52,943	28,241	5,672	1,857	132.6	34.6	72.8	87.5	397.9	205.4
Capital.....	\$129,288,384	\$89,389,151	\$61,423,903	\$40,966,850	\$18,804,599	\$13,826,142	110.5	44.6	45.5	49.9	117.9	36.0
Expenses.....	85,374,185	73,285,470	50,196,736	36,527,203	(²)	(²)	70.1	16.5	46.0	37.4	.....	.....
Services.....	44,293,215	41,228,441	29,877,086	22,118,522	9,144,100	7,589,110	48.3	7.4	38.0	35.1	141.9	20.5
Salaries.....	4,993,591	3,940,293	2,792,376	(²)	(²)	(²)	78.8	26.7	41.1	.....	.....	.....
Wages.....	39,299,624	37,288,148	27,084,710	(²)	(²)	(²)	45.1	5.4	37.7	.....	.....	.....
Materials.....	32,119,499	26,145,522	16,731,009	12,140,985	8,028,621	5,864,365	92.0	22.8	56.3	37.8	51.2	30.9
Miscellaneous.....	8,961,471	5,911,507	3,588,641	2,267,696	(²)	(²)	149.7	51.6	64.7	58.2	.....	.....
Value of products.....	92,095,203	79,607,998	56,539,712	41,051,004	21,154,571	18,467,507	62.9	15.7	40.8	37.7	94.1	14.6
Value added by manufacture (value of products less cost of materials).....	59,975,704	53,462,476	39,808,703	28,910,019	13,125,950	12,603,142	50.7	12.2	34.3	37.7	120.2	4.1

¹ A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures are not available.
² Comparable figures not available. ³ Figures not strictly comparable.

The 363 establishments reported in 1909 as engaged in the manufacture of glass gave employment to an average of 72,573 persons, of whom 68,911 were wage earners, and paid \$44,293,215 in salaries and wages. These establishments turned out products to the value of \$92,095,203, to produce which materials costing \$32,119,499 were utilized, and the value added by manufacture was \$59,975,704, which represented 65.1 per cent of the value of products.

From 1899 to 1909 the average number of wage earners increased 16,093, or 30.5 per cent, and the value of products \$35,555,491, or 62.9 per cent. The industry manifests a consistent development through-

out the 40-year period covered by the table. Comparing 1909 with 1869, it will be seen that the number of establishments was more than twice as great in 1909 as at the earlier date, the number of wage earners more than four times as great, the value of products nearly five times as great, and the primary horsepower more than sixty-six times as great.

Summary, by states.—Table 2 summarizes the more important statistics of the industry, by states, the states being arranged according to the value of products reported for 1909. Some states for which data can not be shown separately ranked higher than some named in the table.

STATE.	Number of establishments: 1909	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			PER CENT OF INCREASE. ¹								
		Average number: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Amount: 1909	Per cent of total: 1909	Rank.	Wage earners (average number).			Value of products.			Value added by manufacture.		
											1909	1904	1899	1909	1904	1899	1909	1904	1899
United States.	363	66,911	100.0	.....	\$32,095,203	100.0	.....	\$69,975,704	100.0	.....	30.5	7.7	21.1	62.9	15.7	40.8	50.7	12.8	34.3
Pennsylvania.....	112	23,710	34.4	1	32,817,936	35.6	1	20,184,023	33.7	1	22.1	14.0	7.1	49.1	18.6	25.7	29.6	10.0	17.8
Ohio.....	45	10,159	14.7	2	14,358,274	15.6	2	9,670,288	16.1	2	123.5	29.5	72.5	215.8	59.1	98.5	193.6	58.2	87.9
Indiana.....	44	9,544	13.8	3	11,593,094	12.6	3	6,865,591	11.4	3	-26.7	-20.6	-7.6	-21.4	-21.2	-0.3	-32.5	-25.0	-10.1
West Virginia.....	51	6,190	9.0	4	7,779,483	8.4	4	5,483,555	9.1	4	217.6	68.5	88.5	315.5	69.1	145.7	328.7	64.2	161.1
New Jersey.....	23	5,651	8.2	5	6,361,088	7.6	5	4,962,491	8.3	5	5.0	2.6	2.3	36.6	7.9	26.6	37.6	8.0	27.4
Illinois.....	11	3,507	5.1	6	5,047,333	5.5	6	3,505,879	5.8	6	6.1	-26.4	44.3	78.1	-10.2	98.3	62.3	-18.9	95.4
New York.....	24	3,114	4.5	7	4,508,790	4.9	7	3,349,713	5.6	7	21.8	-1.2	23.3	63.5	5.4	55.2	80.4	16.8	54.4
Kansas.....	23	1,435	2.1	9	2,036,373	2.2	8	1,364,829	2.3	8	.....	99.9	.....	112.4	.....	.....	126.0	.....	.....
Missouri.....	4	1,755	2.5	8	1,992,883	2.2	9	1,046,137	1.7	9	170.0	12.4	140.2	160.2	11.9	132.5	95.9	-2.5	100.9
Maryland.....	7	1,052	1.5	10	1,038,368	1.1	10	801,549	1.3	10	41.7	62.1	-12.5	86.0	75.9	5.7	97.3	85.8	6.2
Virginia.....	5	524	0.8	13	681,900	0.7	13	431,113	0.7	13	.....	11.0	.....	24.2	.....	.....	13.4	.....	.....
All other states.....	14	2,270	3.3	.....	3,279,481	3.6	.....	2,310,536	3.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Percentages are based on figures in Table 19. A minus sign (—) denotes decrease. Percentage not shown where comparative figures can not be given without disclosing individual operations.

The glass industry is highly centralized, the bulk of the production being reported by five adjoining states. These five states reported more than three-fourths (75.8 per cent) of the number of establishments, over four-fifths (80.2 per cent) of the wage earners, and almost four-fifths (79.8 per cent) of the value of products.

Pennsylvania was by far the most important state in the industry, the value of the products of the establishments of this state in 1909 representing more than one-third of the total for the United States. Ohio ranked second in value of products in 1909 and Indiana third, a reversal of the ranking of these states in 1904.

Of the states shown in the table, West Virginia showed the greatest relative development in the industry, the number of wage earners having increased 217.6 per cent from 1899 to 1909, and the value of products 315.5 per cent, while the state advanced in rank from sixth place in 1904 to fourth in 1909. Ohio and Missouri also showed large increases in number of wage earners and value of products during the decade.

In general, the states held the same or nearly the same rank with respect to value of products in 1909 as in 1904, and all of the states had the same rank in value added by manufacture in 1909 as in value of products.

Persons engaged in the industry.—Table 3 shows, for 1909, the number of persons engaged in the industry, classified according to occupational status and sex, and in the case of wage earners according to age also. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

The average number of persons engaged in the industry during 1909 was 72,573, of whom 68,911, or 95 per cent, were wage earners, 1,376, or 1.9 per cent, proprie-

tors and officials, and 2,286, or 3.1 per cent, clerks, this class including other subordinate salaried employees. Of the total number of persons engaged in the industry, 67,811, or 93.4 per cent, were males, and 4,762, or 6.6 per cent, females. Of the total number of females, 85.7 per cent were wage earners, employed chiefly in the packing departments. The number of children employed as wage earners was 3,561, or 5.2 per cent of the total number of wage earners.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909		
	Total.	Male.	Female.
All classes.....	72,573	67,811	4,762
Proprietors and officials.....	1,376	1,366	10
Proprietors and firm members.....	87	82	5
Salaried officers of corporations.....	479	475	4
Superintendents and managers.....	810	809	1
Clerks.....	2,286	1,616	670
Wage earners (average number).....	68,911	64,829	4,082
16 years of age and over.....	65,350	61,639	3,711
Under 16 years of age.....	3,561	3,190	371

The average number of wage earners in each state for 1909, 1904, and 1899 is given in Table 19. The average number distributed by sex and age is not shown for individual states, but Table 20 gives such a distribution of the number employed on December 15, or the nearest representative day. Female wage earners were reported from 16 states, the largest number, 1,770, being reported from Pennsylvania, and the next largest, 1,074, from Ohio. Employees under 16 years of age were fairly well distributed among the states.

In order to compare the distribution of the persons engaged in the industry in 1909, according to occupational status, with that in 1904, it is necessary to use the classification employed at the earlier census. (See Introduction.) Such a comparison is made in Table 4.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY.				Per cent of increase: ¹ 1904-1909
	1909		1904		
	Number.	Per cent distribution.	Number.	Per cent distribution.	
Total	72,573	100.0	67,105	100.0	8.1
Proprietors and firm members.....	87	0.1	96	0.1	-9.4
Salaried employees.....	3,575	4.9	3,040	4.5	17.6
Wage earners (average number).....	68,911	95.0	63,969	95.3	7.7

¹ A minus sign (-) denotes decrease.

Table 5 shows the average number of wage earners in the industry distributed according to age, and in the case of those 16 years of age and over, according to sex, for 1909, 1904, and 1899.

The most significant fact brought out in this table is the decline in the number of children employed in the industry, only about half as many being employed in 1909 as in 1899. The number of women employed was comparatively small and was proportionately less

in 1909 and 1904 than in 1899, but the relative number of men in the industry was considerably larger in 1909 than in 1899.

CLASS.	AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY.					
	1909		1904		1899	
	Number	Per cent distribution.	Number	Per cent distribution.	Number	Per cent distribution.
Total	68,911	100.0	63,969	100.0	52,818	100.0
16 years of age and over.....	65,350	94.8	57,534	89.9	45,702	86.5
Male.....	61,639	89.4	54,079	84.6	42,173	79.8
Female.....	3,711	6.4	3,455	6.4	3,529	6.7
Under 16 years of age.....	3,561	6.2	6,436	10.1	7,116	13.5

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the industry on the 15th (or the nearest representative day) of each month during the year 1909 for 12 of the leading states in which an average of 500 or more wage earners were employed during the year.

STATE.	Average number during the year.	WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909 ¹											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	68,911	72,831	75,720	78,821	77,692	76,550	73,038	40,222	43,839	56,127	71,746	78,454	81,665
California.....	640	679	757	711	749	841	834	196	<i>135</i>	652	680	720	721
Illinois.....	3,507	4,351	4,246	4,336	4,398	4,386	4,243	1,975	1,908	<i>1,441</i>	2,837	3,634	4,321
Indiana.....	9,544	10,056	10,581	11,103	10,533	10,793	9,942	<i>5,867</i>	5,872	6,800	10,168	11,082	11,731
Kansas.....	1,435	1,300	1,778	1,847	1,734	1,608	1,544	<i>453</i>	468	1,005	1,492	1,978	2,033
Maryland.....	1,052	1,032	1,089	1,250	1,276	1,253	1,278	514	<i>417</i>	926	1,156	1,214	1,272
Missouri.....	1,755	1,490	1,541	1,626	1,699	1,493	1,762	1,621	1,666	1,786	2,032	2,175	2,170
New Jersey.....	5,651	7,217	7,212	7,202	7,286	7,023	6,144	1,345	<i>1,161</i>	2,742	6,035	7,205	7,253
New York.....	3,114	3,553	3,555	3,630	3,695	3,789	3,397	1,743	<i>1,497</i>	2,025	3,174	3,591	3,714
Ohio.....	10,159	11,051	11,282	11,312	11,089	11,065	10,286	<i>5,888</i>	6,790	8,985	10,779	11,667	11,814
Pennsylvania.....	23,710	24,057	24,901	26,256	25,861	25,464	25,303	<i>16,242</i>	18,019	21,698	24,378	25,630	26,711
Virginia.....	524	583	600	600	620	637	663	<i>46</i>	52	654	636	589	609
West Virginia.....	6,190	5,363	6,021	6,933	6,899	6,621	6,145	<i>3,316</i>	4,856	6,170	6,894	7,393	7,889

¹ The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

The industry is most active during the colder months of the year, since most establishments shut down for a time during the summer to clean up and make repairs. July was the month of minimum employment in six, and August in four states shown in the table. The largest number of wage earners employed in the industry during any month of 1909 was 81,665, in December, and the smallest number, 40,222, in July, the minimum number being equal to 49.3 per cent of the maximum. In 1904 the maximum number, 74,316, was shown for April, and the minimum number, 28,246, for July, the latter number being equal to 38 per cent of the former.

In five of the states (Indiana, Kansas, Ohio, Pennsylvania, and West Virginia) the month of maximum employment was December and in Missouri it was November, but in the other states shown in the table the greatest number of wage earners were employed in the spring and early summer.

Prevailing hours of labor.—In Table 7 the wage earners in the industry have been classified according

to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification the average number of wage earners employed during the year in each establishment was classified as a total, according to the hours prevailing in that establishment, even though a few employees worked a greater or smaller number of hours.

More than one-half (53.2 per cent) of the wage earners employed in the industry in 1909 were in establishments where the prevailing hours were 54 or less per week, 20.2 per cent were employed in establishments where the prevailing hours were between 54 and 60 per week, and 26.6 per cent in establishments where the prevailing hours were 60 or more per week.

Of the seven groups shown in the table, the largest was that made up of the wage earners in establishments where the prevailing hours were between 48 and 54 per week, such wage earners constituting 24.1 per cent of the total number. This group was most

important, likewise, in five of the individual states for which figures are given. In Missouri the most common working time was between 60 and 72 hours per week and in Ohio and Pennsylvania it was between 54 and 60 hours per week.

Table 7 AVERAGE NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Between 48 and 54.	54.	Between 54 and 60.	60.	Between 60 and 72.	72 and over.
		United States	68,911	11,358	15,603	8,707	13,923	10,784	3,423	4,133
California.....	640	94	100	540	.....	676	.....	1,700
Illinois.....	3,507	94	957	80	.....	.....	.....	.....
Indiana.....	9,544	1,850	2,109	1,978	1,575	1,584	448	.....
Kansas.....	1,435	831	126	166	39	273	.....	.....
Maryland.....	1,052	181	482	389	.....	.....	.....	.....
Missouri.....	1,755	102	102	.....	224	.....	1,066	363
New Jersey.....	5,651	1,007	2,451	420	1,773	.....	.....	.....
New York.....	3,114	369	776	280	323	1,361	.....	.....
Ohio.....	10,159	1,797	2,279	1,726	2,501	1,139	652	65
Pennsylvania.....	23,710	3,049	4,406	1,045	6,235	5,468	1,257	1,650
Virginia.....	524	.....	465	59	.....	.....	.....	.....
West Virginia.....	6,190	1,866	2,252	1,424	385	263	.....	.....

Character of ownership.—Table 8 presents statistics with respect to the character of ownership of establishments in the glass industry.

Table 8 CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	363	899	\$82,095,203	\$79,607,998
Individual.....	23	21	1,529,780	1,234,551
Firm.....	19	26	1,426,929	2,619,890
Corporation.....	321	337	89,138,494	74,836,170
Other.....	.....	15	.....	917,387
Per cent of total.....	100.0	100.0	100.0	100.0
Individual.....	6.3	5.3	1.7	1.6
Firm.....	5.2	6.5	1.5	3.3
Corporation.....	88.4	84.5	96.8	94.0
Other.....	.....	3.8	.....	1.2

In 1909, of the total number of establishments, 88.4 per cent were under corporate ownership, as compared with 84.5 per cent in 1904. In 1909 the value of products of these establishments represented 96.8 per cent of the total, and in 1904, 94 per cent. In 1904, 15 establishments were operated by cooperative associations, but no establishments were reported for this form of ownership in 1909.

Table 9 gives statistics for establishments, classified according to form of ownership, for the 11 states employing an average of more than 500 wage earners in 1909 for which figures can be shown without disclosing individual operations.

Table 9 STATE.	NUMBER OF ESTABLISHMENTS OWNED BY—			WAGE EARNERS IN ESTABLISHMENTS OWNED BY—			VALUE OF PRODUCTS OF ESTABLISHMENTS OWNED BY—			VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS OWNED BY—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	23	19	321	1,317	1,316	66,278	\$1,529,780	\$1,426,929	\$89,138,494	\$1,031,246	\$1,069,150	\$57,675,308
Illinois.....	.....	1	10	.....	(X)	5,507	.....	(X)	5,047,353	.....	(X)	5,505,879
Indiana.....	3	.....	41	454	.....	9,090	430,916	.....	11,152,178	254,597	.....	6,610,994
Kansas.....	5	1	17	146	(X)	1,289	207,517	(X)	1,829,058	148,408	(X)	1,216,421
Maryland.....	.....	1	6	.....	(X)	1,052	.....	(X)	1,038,368	.....	(X)	801,549
Missouri.....	.....	.....	4	.....	.....	1,755	.....	.....	1,992,883	.....	.....	1,046,137
New Jersey.....	3	1	19	262	(X)	5,389	329,958	(X)	6,631,150	246,934	(X)	4,715,557
New York.....	2	2	20	158	(X)	2,976	193,968	(X)	4,314,822	134,783	(X)	3,214,930
Ohio.....	3	2	40	300	(X)	9,859	397,729	(X)	13,960,545	278,867	(X)	9,391,421
Pennsylvania.....	2	7	103	(X)	663	23,047	(X)	859,416	31,958,521	(X)	628,500	19,557,523
Virginia.....	.....	.....	5	.....	.....	524	.....	.....	681,900	.....	.....	431,113
West Virginia.....	5	4	42	44	80	6,066	49,969	72,213	7,657,301	37,189	59,101	5,387,265

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted, and the figures for the group with which they have been combined are printed in italics.

In 1909, 1,317 wage earners, or 1.9 per cent of the total, were employed in establishments under individual ownership; 1,316, or 1.9 per cent, in those under firm ownership; and 66,278, or 96.2 per cent, in those owned by corporations.

Size of establishments.—Table 10 presents statistics for 1909 and 1904 for establishments grouped according to the value of their products.

There was a marked decline during the five years, 1904-1909, both in number and in value of products of establishments producing goods valued at less than \$100,000, whereas establishments with products valued at \$100,000 or more in each of the years showed an equally marked increase in number and in value of output. This latter class represented 68.4 per cent of the number of establishments in 1909, as compared with

58.9 per cent in 1904, and reported 93.6 per cent of the total value of products in 1909 as against 89.5 per cent in 1904.

Table 10 VALUE OF PRODUCTS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.		VALUE OF PRODUCTS.	
	1909	1904	1909	1904
Total.....	363	399	\$82,095,203	\$79,607,998
Less than \$5,000.....	11	9	33,445	24,738
\$5,000 and less than \$20,000.....	13	24	138,525	279,562
\$20,000 and less than \$100,000.....	91	131	5,091,849	8,036,868
\$100,000 and less than \$1,000,000.....	238	230	69,534,919	62,274,058
\$1,000,000 and over.....	10	5	16,696,465	8,992,772
Per cent of total.....	100.0	100.0	100.0	100.0
Less than \$5,000.....	3.0	2.3	(¹)	(¹)
\$5,000 and less than \$20,000.....	3.6	6.0	0.2	0.4
\$20,000 and less than \$100,000.....	25.1	32.8	0.2	10.1
\$100,000 and less than \$1,000,000.....	65.6	57.6	75.5	78.2
\$1,000,000 and over.....	2.8	1.3	18.1	11.3

¹ Less than one-tenth of 1 per cent.

The average value of products per establishment increased from \$199,519 in 1904 to \$253,706 in 1909, and the value added by manufacture, as computed from figures in Table 1, from \$133,991 to \$165,222, while the average number of wage earners per estab-

lishment increased from 160 to 190 during this period.

Classification by number of wage earners.—Table 11 classifies the establishments in 12 of the leading states according to the number of wage earners employed.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING IN 1909—																
			No wage earners.		1 to 5 wage earners.		5 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.		Over 1,000 wage earners.
	Estab-lish-ments.	Wage earners (average number)	Estab-lish-ments.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States.....	363	68,911	.....	12	35	22	316	41	1,450	81	6,170	122	19,202	58	21,173	20	12,206	7	8,359
California.....	3	640	.....	.....	.....	.....	.....	1	44	1	100	.....	.....	1	496	.....	.....	.....	.....
Illinois.....	11	3,507	.....	.....	.....	1	15	1	24	2	174	3	490	2	707	1	637	1	1,460
Indiana.....	44	9,544	.....	.....	.....	5	90	1	25	6	428	20	3,361	10	3,915	1	612	1	1,112
Kansas.....	23	1,435	.....	3	5	1	6	7	240	7	532	5	652	.....	.....	.....	.....	.....	.....
Maryland.....	7	1,052	.....	.....	.....	1	11	1	30	2	151	1	181	2	679	.....	.....	.....	.....
Missouri.....	4	1,755	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	326	1	363	.....	.....	1	1,066
New Jersey.....	23	5,651	.....	2	10	.....	.....	1	33	5	388	6	876	7	2,398	1	617	1	1,329
New York.....	24	3,114	.....	1	5	1	9	4	162	8	604	9	1,357	.....	.....	1	977	.....	.....
Ohio.....	45	10,159	.....	.....	.....	3	54	5	164	8	544	16	2,659	6	2,260	6	3,440	1	1,038
Pennsylvania.....	112	23,710	.....	1	3	5	62	11	442	25	1,938	37	5,805	22	7,811	9	5,295	2	2,354
Texas.....	5	524	.....	.....	.....	.....	.....	.....	.....	3	218	2	306	.....	.....	.....	.....	.....	.....
W. Virginia.....	51	6,190	.....	5	12	4	51	7	214	11	854	18	2,647	5	1,774	1	528	.....	.....

Of the 363 establishments reported in 1909, 9.4 per cent employed from 1 to 20 wage earners each, 33.6 per cent from 21 to 100, 49.6 per cent from 101 to 500, and only 7.4 per cent over 500 each. Seven establishments employed 1,000 wage earners or more. Of the total number of wage earners, five-tenths of 1 per cent were reported by establishments employing from 1 to 20, 11.1 per cent by establishments employing from 21 to 100, 58.6 per cent by establishments employing from 101 to 500, and 29.8 per cent by establishments employing over 500. The seven largest establishments together reported 12.1 per cent of the total number of wage earners.

Expenses.—As stated in the Introduction, the census figures representing expenses do not purport to show the total cost of manufacture, since they take no account of interest or depreciation; hence they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses in 1909 to have been \$85,374,185, distributed as follows: Cost of materials, \$32,119,499, or 37.6 per cent; wages, \$39,299,624, or 46 per cent; salaries, \$4,993,591, or 5.8 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, insurance, traveling expenses, and other sundry expenses, \$8,961,471, or 10.5 per cent. These proportions, as may be seen by comparing the items in Table 20, vary somewhat in the several states.

Engines and power.—The amount of power used in the glass industry was first reported at the census of 1869. Table 1 shows that the total horsepower used increased from 1,857 in 1869 to 123,132 in

1909. Table 12 shows statistics of power as reported at the censuses of 1909, 1904, and 1899.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			PER CENT DISTRIBUTION OF HORSEPOWER.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total.....	1,428	1,108	839	123,132	91,476	52,943	100.0	100.0	100.0
Owned.....	1,122	1,043	839	113,707	90,893	52,887	97.2	99.4	99.9
Steam.....	765	742	753	98,971	76,599	49,791	80.4	83.7	94.0
Gas.....	356	297	84	20,731	13,947	2,364	16.8	15.2	4.5
Water wheels.....	.....	2	2	.....	20	27	(1)	(1)	(1)
Water motors.....	1	2	(?)	5	11	(?)	(1)	(1)	.....
Other.....	.....	.....	.....	.....	316	705	.....	0.3	1.3
Rented.....	306	65	(?)	3,425	583	56	2.8	0.6	0.1
Electric.....	306	65	(?)	3,425	583	44	2.8	0.6	0.1
Other.....	.....	.....	.....	.....	.....	12	.....	.....	(1)
Electric motors.....	2,510	965	178	43,569	16,769	6,030	100.0	100.0	100.0
Run by current generated by establishment.....	2,204	900	178	40,164	16,186	5,986	92.1	96.5	99.3
Run by rented power.....	306	65	(?)	3,425	583	44	7.9	3.5	0.7

¹ Less than one-tenth of 1 per cent.

² Not reported.

The total primary power used in the glass industry increased from 52,943 horsepower in 1899 to 123,132 horsepower in 1909, or 132.6 per cent during the decade. At each census, power generated by steam engines constituted more than four-fifths of the total primary power, but in spite of the fact that the amount of steam power almost doubled between 1899 and 1909, it represented a smaller proportion of the total at the later census than at the earlier. The amount of power produced by gas or other internal-combustion engines was nearly nine times as great in 1909 as in 1899, and the proportion which such power formed of the total primary power advanced during the decade from 4.5 per cent to 16.8 per cent.

The horsepower of electric motors used for distributing power by means of current generated in the establishment increased from 5,986 in 1899 to 40,164 in 1909.

Table 13 shows, for 1909, the amount of the several kinds of power and of the different kinds of fuel used in 12 of the states leading in the industry.

STATE.	PRIMARY HORSEPOWER.							ELECTRIC HORSEPOWER.		FUEL USED.						
	Number of establishments reporting.	Total horsepower.	Owned by establishments reporting.				Rented.		Total, rented and generated by establishment.	Generated in the establishment reporting.	Coal.		Coke (short tons).	Wood (cords).	Oil, including gasoline (barrels).	Gas (1,000 feet).
			Total.	Steam engines.	Gas engines.	Water wheels and motors.	Other.	Electric.			Other.	Anthracite (long tons).				
United States..	353	123,132	119,707	98,871	20,731	5	3,425	43,589	40,164	17,906	1,859,001	17,393	12,433	463,894	43,711,519	
California.....	3	692	295	295			297	297						72,808	870	
Illinois.....	11	6,638	6,205	6,155	50		433	1,619	1,186		270,826	4,713	10	33,693	75,000	
Indiana.....	44	21,031	20,687	17,951	2,736		344	4,645	4,301	443	457,900	738	175	66,957	146,069	
Kansas.....	23	1,031	976	603	373		65	140	85					1,020	2,289,789	
Maryland.....	7	427	257	235	22		170	230	60	640	21,388	175	331	5,642	17,680	
Missouri.....	4	8,820	8,770	8,770			50	11,833	11,783		169,028	30	100	27,000		
New Jersey.....	22	3,081	3,060	3,046	14		21	372	351	5,583	104,230	2,381	8,491	138,011	1,900	
New York.....	24	1,774	1,604	1,184	420		170	505	335	4,363	68,340	1,204	625	63,760	93,890	
Ohio.....	44	16,198	15,652	11,782	3,870		546	9,995	9,449	89	210,815	1,397	5	4,498	12,728,090	
Pennsylvania.....	111	55,182	54,284	43,393	10,896	5	898	12,804	11,906	6,788	453,613	4,093	2,079	34,966	22,605,700	
Virginia.....	5	245	170	170			75	85	10		17,653	1		1,047		
West Virginia.....	44	5,233	4,957	2,602	2,355		278	719	443		3,483			30	5,734,500	
All other states.....	11	2,880	2,790	2,785	5		90	345	255		81,725	2,663	670	19,462	17,800	

In 1909 Pennsylvania, Indiana, Ohio, Missouri, and Illinois together reported 107,869 horsepower, or 87.6 per cent of the aggregate for the industry. Steam power was the most important form of power in all of the states shown separately except California, where the amount of steam power was slightly less than that of rented electric power. The largest amount of steam power, 43,393 horsepower, was shown for Penn-

sylvania, this state also reporting more than half of the total amount of power generated by gas engines.

Fuel consumed.—Gas, which was practically all natural gas, was the most important class of fuel used, the quantity amounting to over 43 billion feet. The largest amount was reported by Pennsylvania. Bituminous coal was next in importance, 1,859,001 tons being consumed during 1909.

SPECIAL STATISTICS RELATING TO MATERIALS, PRODUCTS, AND EQUIPMENT.

Materials.—Table 14 shows statistics of the principal materials used in the industry for 1909, 1904, and 1899.

PRINCIPAL MATERIALS.	1909	1904	1899
Total cost of all materials.....	\$32,119,499	\$26,145,522	\$16,731,009
Glass sand, tons.....	1,004,086	769,792	581,720
Soda ash (carbonate of soda), tons.....	873,764	215,462	157,779
Salt cake (sulphate of soda), tons.....	76,540	53,905	63,257
Nitrate of soda, tons.....	19,676	11,915	10,770
Limestone, tons.....	156,377	115,655	91,015
Lime, bushels.....	1,256,117	1,166,342	993,349
Arsenic, pounds.....	3,140,720	2,676,650	2,349,261
Carbon, tons.....	5,480	3,750	4,155
Manganese, pounds.....	3,882,465	3,096,939	1,493,538
Litharge and red lead, pounds.....	11,653,149	9,613,649	8,386,106
Potash or pearlash, pounds.....	6,938,355	5,446,338	4,406,211
Grinding sand, tons.....	706,689	410,856	265,438
Rouge, pounds.....	1,383,182	1,098,566	837,536

From 1899 to 1909 the total cost of materials used increased \$15,388,490, or 92 per cent. Of the several materials used, the grinding sand, manganese, and soda ash, increased in quantity considerably more than 100 per cent during the decade, and all of the materials were used in larger quantities in 1909 than in 1899.

Products.—Table 15 shows in some detail statistics of products manufactured in 1909, 1904, and 1899 by establishments in the industry.

Of the 363 establishments reported for 1909, 104 were engaged in the manufacture of building glass, 114 manufactured pressed and blown glass, and 166 produced bottles and jars, while of the 355 establishments in 1899, 124 produced building glass, 84 pressed and blown glass, and 147 bottles and jars. Of the total value of products in 1909, building glass contributed 28.6 per cent; pressed and blown glass, 29.8 per cent; bottles and jars, 39.1 per cent; and "all other products," 2.6 per cent. In 1899 building glass contributed 30.2 per cent; pressed and blown glass, 30.2 per cent; bottles and jars, 38.3 per cent; and "all other products," 1.2 per cent.

From 1899 to 1909 there was an increase of 53.9 per cent in the value of the building glass, due largely to the increased production of polished plate glass, which increased 180.6 per cent in quantity and 136.6 per cent in value during this period. The quantity and value of rough plate glass made for sale was less

in 1909 than in 1899, which is also true of the quantity of cathedral glass.

PRODUCT.	1909	1904	1899
Total value	\$92,095,203	\$79,607,998	\$56,539,712
Building glass	\$26,308,438	\$21,697,861	\$17,096,234
Window—			
50-foot boxes.....	6,921,611	4,852,315	4,341,282
Value.....	\$11,742,959	\$11,610,851	\$10,879,355
Plate—			
Total cast, square feet.....	60,105,694	34,804,986	21,172,129
Polished—			
Square feet.....	47,370,254	27,293,138	16,883,578
Value.....	\$12,204,875	\$7,978,253	\$5,168,598
Rough, made for sale—			
Square feet.....	205,690	17,784	628,684
Value.....	\$37,431	\$3,529	\$75,887
Cathedral—			
Square feet.....	7,405,980	6,615,093	8,846,361
Value.....	\$569,848	\$293,623	\$567,252
Skylight—			
Square feet.....	15,409,966	15,255,541	3,679,694
Value.....	\$783,726	\$678,391	\$165,086
All other.....	\$964,599	\$1,133,214	\$250,056
Pressed and blown glass	\$27,393,445	\$21,956,168	\$17,078,125
Tableware, 100 pieces.....	1,286,056	1,283,974	655,141
Jellies, tumblers, and goblets, dozens.....	11,687,036	7,346,214	8,544,050
Lamps, dozens.....	322,482	487,017	807,765
Chimneys, dozens.....	6,652,967	7,039,756	6,901,192
Lantern globes, dozens.....	952,620	1,765,247	1,044,818
Globes and other electrical goods, dozens.....	11,738,798	1,901,415	(³)
Shades, globes, and other gas goods, dozens.....	1,541,449	878,244	2,673,854
Blown tumblers, stem ware, and bar goods, dozens.....	9,182,060	6,282,606	6,127,367
Opal ware, dozens.....	3,095,666	1,091,208	3,750,443
Cut ware, dozens.....	206,336	83,736	134,726
Bottles and jars	\$36,018,333	\$33,631,063	\$21,676,791
Prescriptions, vials, and druggists' wares, gross.....	3,624,022	3,202,586	2,423,932
Beer, soda, and mineral, gross.....	2,345,204	2,351,852	1,351,118
Liquors and flasks, gross.....	1,887,344	2,157,801	985,374
Milk jars, gross.....	440,302	253,651	146,142
Fruit jars, gross.....	1,124,485	1,061,829	789,298
Battery jars and other electrical goods, gross.....	9,981	19,974	(³)
Patent and proprietary, gross.....	1,637,798	1,657,372	1,296,131
Packers and preservers, gross.....	1,237,175	1,237,065	784,588
Demijohns and carboys, dozens.....	122,570	64,450	83,243
All other products	\$2,369,887	\$2,322,916	\$690,562

¹ In addition, 42,639 gross of bottles and jars, valued at \$90,490, were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

² In addition, glassware to the value of \$9,663 was made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

³ Not reported.

The value of pressed and blown glass increased 60.4 per cent during the decade, the percentages of increase in this class of goods being largest for tableware, cut ware, and blown tumblers, stem ware, and bar goods. Globes and other electrical goods were not reported separately in 1899; between 1904 and 1909, however, there was an increase of 9,837,383 dozens, or 517.4 per cent. Decreases took place in the output of lamps and their appurtenances, in gas fixtures, and in opal ware. Few of the glass plants make finished cut glass, the item "cut ware" representing principally the glass blanks, which have not been cut and polished, and which are sold to establishments making a specialty of producing the finished ware. In the general census reports these latter establishments are included under the classification, "glass, cutting, staining, and ornamenting."

The increase from 1899 to 1909 in the value of bottles and jars amounted to \$14,341,542, or 66.2 per cent,

most of the different kinds reported showing large gains. The item "all other products," includes sundry unclassified glass products, paper and wooden boxes, barrels, metal tops and caps, pottery, and printed matter.

Table 16 shows, for 1909, 1904, and 1899, the value of each of the three classes of products in the leading states in the glass industry:

PRODUCT AND STATE.	1909	1904	1899
Total value	\$92,095,203	\$79,607,998	\$56,539,712
Building glass (including plate and window glass), total	26,308,438	21,697,861	17,096,234
Illinois.....	648,718	281,559	24,000
Indiana.....	1,616,092	3,780,618	5,711,948
Kansas.....	1,131,808	381,084	.....
Missouri.....	1,778,364	1,036,433	505,664
New Jersey.....	(¹)	201,922	274,011
New York.....	173,387	456,310	346,790
Ohio.....	2,744,513	1,625,126	671,422
Pennsylvania.....	14,958,649	12,169,013	9,213,545
West Virginia.....	2,751,133	1,323,896	101,242
All other states.....	505,774	431,900	247,712
Pressed and blown glass, total	27,393,445	21,956,168	17,078,125
Indiana.....	2,774,128	2,859,087	2,691,787
Kansas.....	202,696	64,697	.....
Maryland.....	508,492	46,191	100,000
New Jersey.....	1,019,836	181,559	21,300
New York.....	1,926,852	1,932,524	1,173,784
Ohio.....	6,160,707	3,954,660	2,738,289
Pennsylvania.....	9,847,223	9,406,183	8,453,550
West Virginia.....	4,306,528	2,620,665	1,379,706
All other states.....	651,978	890,592	517,709
Bottles and jars, total	36,018,333	33,631,063	21,676,791
California.....	873,434	855,446	(¹)
Illinois.....	4,304,795	4,949,156	2,678,780
Indiana.....	6,982,378	7,213,456	6,327,468
Kansas.....	651,376	407,868	.....
Maryland.....	528,767	536,478	346,633
Missouri.....	(¹)	607,383	260,000
New Jersey.....	5,884,605	6,066,714	4,452,219
New York.....	1,894,394	1,866,245	1,195,276
Ohio.....	4,717,658	2,961,727	1,058,955
Pennsylvania.....	7,778,787	5,951,144	4,162,990
Virginia.....	681,900	549,031	(¹)
West Virginia.....	646,521	602,002	381,847
All other states.....	1,083,718	1,064,413	812,623
All other products	2,369,887	2,322,916	690,562

¹ Included in "All other states," to avoid disclosure of individual operations.

Pennsylvania produced 56.9 per cent of the total value of building glass in 1909, 35.9 per cent of the value of pressed and blown glass, and 21.6 per cent of the bottles and jars, ranking first in the value of each of these products.

West Virginia ranked second in the value of building glass produced, and Ohio third, but in the production of pressed and blown glass the relative ranking of these states was reversed. Indiana was second in the value of bottles and jars produced, followed by New Jersey, Ohio, and Illinois, in the order named.

Equipment.—The measure of the productive power of a glass manufacturing establishment is the glass-melting capacity of its pot furnaces and tanks. Table 17 presents for 1909, 1904, and 1899, the statistics of such equipment by states for the establishments in the industry. The idle furnaces and tanks shown in this table represent the idle equipment of active establishments, and not the equipment of establishments which were idle throughout the year.

Table 17

STATE.	Census.	POT FURNACES.				TANKS.							
		Operated.		Idle.		Continuous.				Intermittent.			
		Number.	Number of pots.	Number.	Number of pots.	Operated.		Idle.		Operated.		Idle.	
						Number.	Number of rings.	Number.	Number of rings.	Number.	Capacity, tons.	Number.	Capacity, tons.
United States.....	1909 1904 1899	370 349 391	4,945 4,192 4,300	59 49 60	697 617 807	369 340 192	3,759 3,078 1,671	48 26 14	436 181 79	73 94 130	433 406 818	13 13 17	56 69 83
Illinois.....	1909 1904 1899	9 8 9	107 104 117	1 4 2	20 47 12	24 24 11	201 284 133	4	53	1 4 7	5 20 40	..... 1 .....	..... 10
Indiana.....	1909 1904 1899	18 63 116	307 670 1,220	2 7 9	40 79 134	61 87 71	533 749 564	6 4 4	34 25 12	2 3 33	14 20 208	..... 1 4	..... 8 12
Maryland.....	1909 1904 1899	11 6 10	109 74 91	1 2 2	12 17 16	3 1	21 5 .....	..... ..... .....	..... ..... .....	1 1 1	8 8 6	...............	...............
New Jersey.....	1909 1904 1899	16 19 27	130 147 200	6 4 6	42 38 55	36 35 31	329 310 293	12 11 6	90 71 40	9 11 12	106 60 72	1 2	11 7
New York.....	1909 1904 1899	35 28 24	798 257 200	9 3 5	66 27 47	19 22 14	167 179 115	1 2	7 15	3 3 7	7 10 49	1 1 1	1 6 3
Ohio.....	1909 1904 1899	56 39 37	593 551 444	12 4 5	143 69 95	49 34 12	434 283 95	8 2	98 20	11 12 3	27 33 13	2 3 3	3 9 12
Pennsylvania.....	1909 1904 1899	144 120 143	2,086 1,715 1,758	23 17 25	301 222 359	99 87 43	1,178 864 404	12 6 1	93 54 8	26 36 44	145 137 232	6 3 5	27 12 42
West Virginia.....	1909 1904 1899	37 43 14	339 393 144	2 6 1	24 88 12	33 18	422 155	2 1	45 6	12 19 19	96 90 85	2 5 1	11 24 5
All other states.....	1909 1904 1899	44 23 11	476 281 126	3 2 6	49 32 77	45 32 10	474 247 67	3 3	16 19	8 5 4	25 28 113	1 1	3 2

Active pot furnaces decreased 5.4 per cent in number from 1899 to 1909, but at the same time the number of pots operated (which are of uniform size) increased 15 per cent, indicating an actual increase in the capacity of this sort of equipment.

The number of continuous tanks almost doubled and the number of rings more than doubled from 1899 to 1909. Intermittent or day tanks, on the other hand, decreased 57, or 43.8 per cent, in number, while

their capacity decreased 385 tons, or 47.1 per cent. Of the leading states shown, Indiana alone reported a loss for all classes of equipment, the decline in the glass industry in that state being due to the decrease in the supply of natural gas.

Imports and exports.—Table 18 shows the value of glass imported and exported during each census year from 1869 to 1899 and for each year from 1899 to 1909, inclusive.

VALUE OF GLASS IMPORTED AND OF DOMESTIC GLASS EXPORTED: 1869 TO 1909.¹

Table 18

YEAR.	IMPORTS.									EXPORTS.			
	Total value.	Bottles, vials, carboys, etc.	Cylinder and common window glass, unpolished.	Cylinder and crown glass, polished.		Plate glass.			Glass plates or disks for optical instruments.	All other.	Total value.	Window glass.	All other.
				Unsil- vered.	Silvered.	Fluted, rolled, or rough.	Cast, polished, un- silvered.	Cast, polished, silvered.					
1909.....	\$5,262,190	\$638,934	\$760,164	\$212,690	(2)	\$111,377	\$515,642	(2)	\$455,807	\$2,567,576	\$2,173,193	\$59,427	\$2,113,766
1908.....	6,570,123	904,773	824,616	265,281	\$2,784	115,890	805,656	\$5,901	360,278	3,284,944	2,505,417	107,596	2,397,821
1907.....	7,596,631	997,295	1,037,770	343,208	582	107,343	1,420,109	11,022	218,491	3,460,811	2,604,717	95,388	2,509,329
1906.....	7,507,823	895,752	1,306,723	291,037	1,371	55,934	1,575,375	6,817	199,500	3,265,314	2,433,904	68,327	2,365,577
1905.....	5,948,839	671,699	627,618	289,708	2,393	28,657	1,184,088	4,096	177,457	2,963,123	2,252,799	65,869	2,186,930
1904.....	6,583,168	540,460	1,381,104	322,492	7,004	28,140	945,048	6,831	215,583	3,136,706	1,978,481	71,498	1,906,983
1903.....	7,255,879	493,712	1,762,767	525,380	1,532	57,990	1,432,297	6,991	217,612	2,757,598	2,150,699	59,519	2,091,180
1902.....	6,205,052	458,454	1,827,498	356,518	641	12,581	999,934	6,528	191,089	2,351,809	1,960,106	51,952	1,908,154
1901.....	5,010,675	505,283	908,044	456,947	488	5,931	787,450	18,819	161,512	2,166,201	2,126,309	55,286	2,071,023
1900.....	5,037,931	464,483	1,555,924	539,082	286	7,915	226,295	12,413	125,449	2,106,084	1,936,119	36,218	1,899,901
1899.....	4,303,660	371,394	1,275,184	521,957	622	9,528	233,190	419	119,832	1,771,534	1,503,651	32,690	1,470,961
1889.....	7,724,662	825,411	1,444,982	91,105	756,577	130,172	983,316	1,243,455	10,741	2,238,903	894,200	16,864	877,336
1879.....	3,222,479	(2)	595,070	11,110	(3)	6,527	899,459	575,649	(4)	1,334,764	768,644	(5)	768,644
1869.....	3,895,739	(2)	1,466,138	25,885	(3)	22,173	717,952	625,338	(4)	1,038,253	580,718	(5)	580,718

¹ "Commerce and Navigation of the United States," Bureau of Statistics, Department of Commerce and Labor.

² Included in "all other" glass and glassware imported.

³ Included in "unsilvered" cylinder and crown glass, polished.

⁴ Not reported separately.

⁵ Included in "all other" glass and glassware exported.

At no time during the years covered by the table has the value of exports of glass been as much as half the total value of the glass imported, the nearest approach to this proportion being in 1901, when the value exported equaled 42.4 per cent of the value imported. The exports of glass, however, show a much greater relative increase than the imports, their value being equal in 1909 to 41.3 per cent of the value of the imports, as compared with only 14.9 per cent in 1869. The increased demand for glass products in this coun-

try has been met almost entirely by the growth of the domestic industry, as is shown by the fact that the value of products of the industry in this country was nearly five times as great in 1909 as in 1869, while the value of the imports of glass shows a comparatively small increase during the period. In 1869 the value of the imports represented 21.1 per cent of the value of glass manufactured in this country, but in 1909 it represented only 5.7 per cent.

DETAILED STATE TABLES.

The principal statistics secured by the census inquiry concerning the glass industry are presented, by states, in Tables 19 and 20.

Table 19 shows, for 1909, 1904, and 1899, the number of establishments, number of persons engaged in

the industry, primary horsepower, capital invested, salaries, wages, cost of materials, value of products, and value added by manufacture.

Table 20 gives the more detailed statistics for the industry for 1909 only.

GLASS—COMPARATIVE STATISTICS, BY STATES: 1909, 1904, AND 1899.

STATE.	Census.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufacture (value of products less cost of materials).
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).							
United States	1909	363	72,573	87	3,576	68,911	123,132	\$129,288	\$4,994	\$39,300	\$32,119	\$92,085	\$59,978
	1904	399	67,105	98	3,040	83,969	91,478	89,369	3,940	37,266	28,148	79,806	53,482
	1899	355	55,258	170	2,268	52,818	52,943	81,424	2,792	27,086	16,731	58,540	39,809
Illinois	1909	11	3,686	3	176	3,507	6,638	7,738	231	2,182	1,541	5,047	3,506
	1904	13	4,895	8	119	4,768	1,683	3,676	151	3,012	1,400	5,820	4,220
	1899	6	3,380	1	76	3,304	700	2,182	110	1,621	674	2,834	2,160
Indiana	1909	44	9,936	3	389	9,544	21,031	13,149	526	4,942	4,728	11,593	6,865
	1904	96	12,470	18	432	12,020	14,656	13,884	549	6,638	5,559	14,707	9,148
	1899	110	13,548	24	509	13,015	10,918	12,775	649	7,226	4,582	14,758	10,176
Kansas	1909	23	1,511	7	69	1,435	1,031	1,769	65	986	672	2,037	1,365
	1904	9	745	.....	27	718	452	591	29	447	355	959	604
	1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	1909	7	1,105	6	47	1,052	427	887	64	505	237	1,038	801
	1904	6	882	5	23	649	426	523	35	354	159	590	431
	1899	7	777	4	31	742	230	581	39	340	162	558	406
Missouri	1909	4	1,830	.....	75	1,755	8,820	6,739	150	753	947	1,993	1,046
	1904	6	1,672	.....	111	1,561	5,755	3,219	159	933	708	1,781	1,073
	1899	3	678	.....	26	650	3,110	2,198	47	341	232	706	534
New Jersey	1909	23	6,159	6	502	5,651	3,031	7,415	517	3,340	1,999	6,961	4,962
	1904	22	5,881	5	369	5,507	2,661	6,304	359	3,145	1,856	6,450	4,594
	1899	26	5,718	18	317	5,383	1,756	5,398	285	2,463	1,439	5,094	3,605
New York	1909	24	3,295	7	174	3,114	1,774	4,818	272	1,806	1,159	4,509	3,350
	1904	28	3,304	9	142	3,153	1,604	3,455	202	1,825	1,412	4,280	2,868
	1899	27	2,690	17	117	2,556	1,127	2,243	140	1,306	900	2,757	1,857
Ohio	1909	45	10,630	8	463	10,159	16,198	16,201	716	5,977	4,688	14,358	9,670
	1904	37	8,163	10	309	7,844	11,256	9,254	444	4,512	2,837	9,026	6,189
	1899	28	4,754	9	199	4,546	3,721	5,452	249	2,067	1,253	4,547	3,294
Pennsylvania	1909	112	24,924	34	1,180	23,710	55,182	58,632	1,730	13,436	12,634	32,818	20,184
	1904	122	21,993	32	1,167	20,794	47,750	40,612	1,697	12,518	9,325	27,672	18,347
	1899	119	20,343	81	842	19,420	29,595	28,287	1,110	10,287	6,435	22,011	15,576
Virginia	1909	5	549	.....	25	524	245	526	41	306	251	632	431
	1904	4	485	2	1 ¹	472	100	402	18	264	169	549	380
	1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia	1909	51	6,609	13	308	6,190	5,233	7,399	436	3,628	2,296	7,779	5,483
	1904	39	3,867	6	189	3,673	2,346	4,300	209	2,054	1,259	4,599	3,340
	1899	16	2,040	6	85	1,949	938	1,338	98	789	593	1,872	1,279
All other states	1909	14	2,439	.....	169	2,270	3,472	4,046	247	1,434	967	3,280	2,813
	1904	17	2,948	2	136	2,810	2,867	3,269	188	1,581	1,107	3,375	2,268
	1899	13	1,330	10	87	1,253	848	970	66	646	421	1,343	922

¹ Figures can not be shown without disclosing individual operations.

MANUFACTURES.

GLASS—DETAILED STATISTICS, BY STATES: 1909.

Table 20

STATE.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.								WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horsepower.
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.		
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.	
								Maximum month.	Minimum month.						
United States..	363	72,573	87	1,289	1,618	670	88,911	De 81,665	Jy 40,222	85,285	76,285	4,593	3,948	459	133,133
Illinois.....	11	3,666	3	38	98	40	3,507	Ap 1 4,396	Se 1,441	4,385	3,975	203	202	6	6,638
Indiana.....	44	9,936	3	167	147	75	9,544	De 11,731	Jy 5,867	12,031	10,766	650	573	42	21,031
Kansas.....	23	1,511	7	37	19	13	1,435	De 2,033	Jy 433	2,317	2,227	76	14	-----	1,031
Maryland.....	7	1,105	6	21	23	3	1,052	Ap 1,279	Au 417	1,348	1,152	90	97	9	427
Missouri.....	4	1,830	-----	18	45	12	1,755	No 2,175	Ja 1,490	2,170	2,135	20	15	-----	8,820
New Jersey.....	23	6,159	6	115	287	100	5,651	Ap 7,286	Au 1,151	7,575	7,046	143	384	2	3,081
New York.....	24	3,295	7	77	69	28	3,114	My 3,789	Au 1,497	3,818	3,698	130	84	6	1,774
Ohio.....	45	10,630	8	184	178	101	10,159	De 11,814	Jy 6,888	12,540	10,983	1,023	483	51	16,198
Pennsylvania.....	112	24,924	34	424	543	213	23,710	De 26,711	Jy 16,242	27,857	24,571	1,485	1,516	285	55,182
Virginia.....	5	549	-----	14	10	1	524	Je 663	Jy 46	609	552	3	54	-----	245
West Virginia.....	51	6,509	13	135	121	50	6,190	De 7,669	Jy 3,316	7,655	6,689	669	341	56	5,233
All other states*.....	14	2,439	-----	59	76	34	2,270	-----	-----	2,980	2,691	101	185	3	3,472

STATE.	Capital.	EXPENSES.										Value of products.	Value added by manufacture (value of products less cost of materials).
		Total.	Services.			Materials.		Miscellaneous.					
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.		
United States..	\$129,268,384	\$85,374,185	\$2,844,881	\$2,048,730	\$39,299,624	\$7,523,937	\$24,595,562	\$92,400	\$414,133	\$85,864	\$8,369,074	\$92,095,203	\$59,975,704
Illinois.....	7,738,236	4,664,447	126,669	104,784	2,181,683	468,582	1,072,872	1,320	25,634	636	682,367	5,047,333	3,505,879
Indiana.....	13,148,780	11,083,028	326,510	199,626	4,941,599	998,149	3,729,354	10,000	44,530	6,695	826,665	11,693,094	6,865,591
Kansas.....	1,769,326	1,840,345	44,153	21,211	986,189	85,523	586,221	2,400	13,093	-----	101,556	2,036,573	1,364,829
Maryland.....	887,464	885,093	39,822	24,539	504,634	69,618	167,301	1,120	4,936	-----	73,223	1,038,368	801,549
Missouri.....	6,739,193	2,038,901	94,945	65,026	758,491	323,963	622,783	-----	13,981	-----	169,712	1,992,883	1,046,137
New Jersey.....	7,415,413	6,500,780	230,145	286,597	3,340,284	527,853	1,470,744	550	41,736	-----	902,871	6,961,088	4,962,491
New York.....	4,817,663	3,839,887	190,764	81,502	1,806,470	325,958	833,119	15,263	14,650	16,887	555,274	4,608,790	3,349,713
Ohio.....	16,201,190	12,753,518	456,835	259,528	6,976,989	1,091,415	3,596,571	31,979	68,177	19,321	1,252,703	14,358,274	9,670,288
Pennsylvania.....	58,632,212	31,102,894	1,029,465	700,491	13,436,405	2,898,532	9,735,381	19,833	144,455	11,267	3,127,065	32,817,936	20,184,023
Virginia.....	526,452	628,027	25,525	15,580	305,719	50,896	199,891	-----	574	-----	29,842	681,900	431,113
West Virginia.....	7,368,665	7,045,692	240,939	194,408	3,628,117	400,055	1,895,673	5,885	25,667	28,778	625,970	7,779,483	5,483,555
All other states*.....	4,043,780	2,991,572	139,089	105,438	1,433,044	283,493	685,452	4,050	16,700	2,480	321,826	3,279,481	2,310,536

¹ Same number reported for one or more other months.
² All other states embrace: California, 3 establishments; Georgia, 1; Kentucky, 1; Massachusetts, 2; Michigan, 2; Oklahoma, 1; South Carolina, 1; Tennessee, 1; Texas, 1; Wisconsin, 1.

LAUNDRIES, STEAM

(885)

STEAM LAUNDRIES.

Scope of the statistics.—Laundries are not considered as manufacturing establishments, and no statistics for them were gathered at censuses of manufactures prior to that of 1909. The industry has, however, reached such proportions during recent years that it should no longer be omitted from the industrial census. This report is confined to power laundries and does not include figures for hand laundries using no power. As a rule, establishments included in the census were operated by steam power and are known as steam laundries. In some, however, electric power is employed exclusively, steam and hot water being used only for washing purposes.

Partly by reason of the fact that laundries are not ordinarily considered manufacturing establishments, but chiefly in order to preserve the comparability of the general totals for manufactures, the statistics for steam laundries for 1909 have not been included in the totals relating to all manufacturing industries combined, and the data are not presented in the various general tables giving figures for individual manufacturing industries which appear in Volumes VIII and IX of the Thirteenth Census Reports. A summary of the data for laundries in the United States as a whole is, however, given separately in Volume VIII, and a summary of the data for each state in Volume IX.

Summary for the United States.—Table 1 presents a summary of the statistics for the laundry industry for 1909. As the industry was not reported at prior censuses, there are no comparative statistics.

Table 1	Number or amount: 1909
Number of establishments.....	5,186
Persons engaged in the industry.....	124,214
Proprietors and firm members.....	5,560
Salaried employees.....	9,170
Wage earners (average number).....	109,484
Primary horsepower.....	123,477
Capital.....	\$68,935,226
Expenses.....	85,187,604
Services.....	53,007,747
Salaries.....	8,180,769
Wages.....	44,826,978
Materials.....	17,696,360
Miscellaneous.....	14,483,497
Amount received for work done.....	104,680,086

The 5,186 laundries included in the census of 1909 gave employment to 124,214 persons and paid out \$53,007,747 in salaries and wages, \$17,696,360 for materials, and \$14,483,497 for miscellaneous expenses. The expenditure for materials includes the cost of fuel, power, water, soap, starch, bluing, soda ash and other chemicals, boxes, tags, oil and waste for machinery, and similar commodities used in the operation of the laundries. The 5,186 establishments reported receipts for the work done during the year

amounting to \$104,680,086. In this industry there would, of course be no significance in a figure showing the difference between cost of materials and value of products, an item of much significance in the case of manufacturing industries.

Summary by states.—Table 2 summarizes the more important statistics by states, the states being arranged according to the receipts for work done.

The laundry business is usually local in character, and it naturally attains its greatest importance in the states containing the largest population, and in those where the proportions residing in urban communities are highest. To some extent, however, the rank of the states in the steam-laundry business is affected by differences in the relative importance of steam and hand laundries and still more by differences in the relative extent to which washing is done in the homes. New York, the most populous state, ranked first in the industry. There were 508 steam laundries reported for the state, and they gave employment to 12,578 wage earners, or 11.5 per cent of the total for the United States. The receipts for work done amounted to \$11,446,663, or 10.9 per cent of the total for the industry in the United States. Pennsylvania, which ranked second in population, however, was fourth in the steam-laundry industry, being out-ranked by Illinois and California.

Leaving California and Washington out of account, the 10 states ranking highest in the laundry industry in 1909, as measured by the amount received for work done, were the 10 which ranked the highest in population. California ranked twelfth and Washington thirtieth in population in 1910, but in the laundry industry these states held third and eighth places, respectively. While more than half of the population of both states resided in cities and other incorporated places of 2,500 inhabitants or more, the concentration in urban districts was much less than in a number of other states. The high rank of these two states in the laundry industry is therefore evidently due to local conditions and customs; it is probable that a much smaller proportion of the washing is done at home than in most other states, one reason for this being the difficulty of securing satisfactory domestic help. The higher prices charged by laundries in the Pacific and Mountain states also tend to increase the relative importance of the industry in these states as measured by the amount received for work done.

The rank of the states according to the average number of wage earners employed differs somewhat from their rank according to receipts for work done, partly because of the varying prices charged in different

states. With the exception of New Mexico, all the Pacific Coast and Mountain states rank higher in amount received for work done than in number of wage earners. For the majority of the other states the rank in number of wage earners is the same as or slightly higher than the rank in the amount received for work done. The 15 states ranking highest in the

laundry industry as measured by value of work done contained 59.2 per cent of the population of the United States. The amount received for laundry work in these states formed 74.3 per cent of the total receipts, and their laundries gave employment to 73.1 per cent of the total number of wage earners employed in the industry.

STATE.	POPULATION: 1910				Number of establishments: 1909	WAGE EARNERS: 1909			AMOUNT RECEIVED FOR WORK DONE: 1909		
	Number.	Rank.	Per cent urban.	Per cent rural.		Average number.	Percent of total.	Rank.	Amount.	Per cent of total.	Rank.
United States.....	91,372,266	.....	46.3	53.7	5,186	109,484	100.0	.....	\$104,680,086	100.0	.....
New York.....	9,113,614	1	78.8	21.2	508	12,578	11.5	1	11,446,663	10.9	1
Illinois.....	5,638,691	3	61.7	38.3	448	9,705	8.9	2	10,049,445	9.6	2
California.....	2,377,549	12	61.8	38.2	321	8,038	7.3	4	9,541,795	9.1	3
Pennsylvania.....	7,665,111	2	60.4	39.6	385	9,639	8.8	3	8,331,834	8.0	4
Massachusetts.....	3,366,416	6	92.8	7.2	280	5,958	5.4	5	5,754,572	5.5	5
Ohio.....	4,767,121	4	55.9	44.1	253	5,893	5.4	6	5,388,954	5.1	6
Missouri.....	3,293,335	7	42.5	57.5	171	5,438	5.0	7	4,904,240	4.7	7
Washington.....	1,141,990	30	53.0	47.0	172	3,264	3.0	9	3,814,825	3.6	8
Michigan.....	2,810,173	8	47.2	52.8	219	3,729	3.4	8	3,261,841	3.1	9
Texas.....	3,896,542	5	24.1	75.9	127	3,078	2.8	10	3,220,315	3.1	10
Minnesota.....	2,075,708	19	41.0	59.0	158	2,916	2.7	12	2,855,738	2.7	11
New Jersey.....	2,537,167	11	75.2	24.8	112	2,984	2.7	11	2,779,277	2.7	12
Indiana.....	2,700,876	9	42.4	57.6	163	2,901	2.6	13	2,448,355	2.3	13
Iowa.....	2,224,771	15	30.6	69.4	181	2,123	1.9	15	2,063,451	2.0	14
Colorado.....	799,024	32	50.7	49.3	99	1,833	1.7	17	1,980,693	1.9	15
Wisconsin.....	2,333,860	13	43.0	57.0	147	2,014	1.8	16	1,840,327	1.8	16
Tennessee.....	2,184,789	17	20.2	79.8	63	2,149	2.0	14	1,645,407	1.6	17
Oregon.....	672,765	35	45.6	54.4	58	1,457	1.3	20	1,569,932	1.5	18
Kansas.....	1,690,949	22	29.2	70.8	138	1,490	1.4	19	1,485,967	1.4	19
Connecticut.....	1,114,756	31	89.7	10.3	95	1,441	1.3	21	1,416,122	1.3	20
Kentucky.....	2,289,905	14	24.3	75.7	73	1,554	1.4	18	1,208,811	1.2	21
Oklahoma.....	1,657,155	23	19.3	80.7	93	1,101	1.0	27	1,197,978	1.1	22
Nebraska.....	1,192,214	29	26.1	73.9	76	1,110	1.0	25	1,197,374	1.1	23
Rhode Island.....	542,610	38	96.7	3.3	53	1,076	1.0	28	1,019,404	-1.0	24
Georgia.....	2,609,121	10	20.6	79.4	42	1,332	1.2	23	1,006,724	1.0	25
Virginia.....	2,061,612	20	23.1	76.9	57	1,351	1.2	22	1,003,191	1.0	26
Maryland.....	1,295,346	27	50.8	49.2	41	1,278	1.2	24	993,766	0.9	27
Montana.....	376,053	40	35.5	64.5	26	652	0.6	36	935,260	0.9	28
Alabama.....	2,138,093	18	17.3	82.7	38	1,108	1.0	26	909,130	0.9	29
Louisiana.....	1,656,388	24	30.0	70.0	25	1,036	0.9	29	852,021	0.8	30
District of Columbia.....	331,069	43	100.0	.....	17	993	0.9	30	795,999	0.8	31
Utah.....	373,351	41	46.3	53.7	22	738	0.7	34	794,091	0.8	32
Maine.....	742,371	34	51.4	48.6	78	816	0.7	31	736,367	0.7	33
Arkansas.....	1,574,449	25	12.9	87.1	45	741	0.7	33	684,036	0.7	34
West Virginia.....	1,221,119	28	18.7	81.3	43	679	0.6	35	581,865	0.6	35
North Carolina.....	2,206,257	16	14.4	85.6	43	812	0.7	32	559,949	0.5	36
North Dakota.....	577,056	37	11.0	89.0	34	434	0.4	40	548,175	0.5	37
New Hampshire.....	430,572	39	59.2	40.8	61	608	0.6	37	518,660	0.5	38
Florida.....	752,619	33	29.1	70.9	28	571	0.5	38	474,088	0.4	39
Mississippi.....	1,797,114	21	11.5	88.5	30	529	0.5	39	440,579	0.4	40
South Dakota.....	583,888	36	13.1	86.9	28	386	0.4	41	423,092	0.4	41
Idaho.....	325,594	45	21.5	78.5	24	357	0.3	43	394,226	0.4	42
Arizona.....	204,354	46	31.0	69.0	13	283	0.3	45	369,282	0.3	43
South Carolina.....	1,515,400	26	14.8	85.2	24	373	0.3	42	269,112	0.3	44
Vermont.....	355,956	42	47.5	52.5	32	299	0.3	44	243,753	0.2	45
Wyoming.....	145,965	48	29.6	70.4	14	171	0.2	47	216,847	0.2	46
Delaware.....	202,322	47	48.0	52.0	15	222	0.2	46	187,038	0.2	47
Nevada.....	81,875	49	16.3	83.7	5	105	0.1	49	165,037	0.2	48
New Mexico.....	327,301	44	14.2	85.8	8	146	0.1	48	156,419	0.2	49

Persons engaged in the operation of laundries.—Table 3 shows the number of persons engaged in the steam-laundry industry in 1909, classified according to occupational status and sex, and in the case of wage earners according to age. The table also shows the percentage of males and females in each class. It should be borne in mind that the sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the Introduction.

There were 124,214 persons reported as engaged in the industry in 1909. This includes all classes of employees—collectors and delivery men, as well as the office force and workers in the laundry proper. Of the total number, 109,484, or 88.1 per cent, were wage earners, 8,579, or 6.9 per cent, proprietors and officials,

and 6,151, or 5 per cent, clerks and other subordinate salaried employees.

CLASS.	PERSONS ENGAGED IN THE INDUSTRY: 1909			PER CENT OF TOTAL.	
	Total.	Male.	Female.	Male.	Female.
All classes.....	124,214	42,381	81,833	34.1	65.9
Proprietors and officials.....	8,579	8,065	514	94.0	6.0
Proprietors and firm members....	5,560	5,212	348	93.7	6.3
Salaried officers of corporations....	1,069	1,016	53	95.0	5.0
Superintendents and managers....	1,950	1,837	113	94.2	5.8
Clerks.....	6,151	2,837	3,314	46.1	53.9
Wage earners (average number).....	109,484	31,479	78,005	28.8	71.2
16 years of age and over.....	108,541	31,211	77,330	28.8	71.2
Under 16 years of age.....	943	268	675	28.4	71.6

The laundry industry is one of the few covered by the census of manufactures in which the number of female employees exceeds the number of males. The 81,833 females employed in 1909 formed 65.9 per cent of the total number of persons engaged in the industry. Of the total number of wage earners, 71.2 per cent were females. Females also predominate in the clerical force, forming 53.9 per cent of the total number. There were 943 children (persons under 16 years of age) employed as wage earners, and of this number, 71.6 per cent were females. Men, however, predominate in the administrative force of the laundries.

The average number of wage earners for each state, as reported for the census of 1909, is given in Table 14. The distribution of the average number by sex and age is not shown for the individual states, but Table 14 gives such a distribution of the number employed on December 15, or the nearest representative day.

The greatest number of women (16 years of age or over), 9,164, is shown for New York. Illinois ranked second with 7,323, and Pennsylvania third with 7,048. The largest number of children (persons under 16 years of age), 197, was reported for Pennsylvania, and of these, 158 were females. There are seven states in which more than 4,000 female wage earners 16 years of age or over were employed.

Table 4 shows, in percentages, for each state in which more than 1,000 wage earners were employed, the distribution according to sex and age of the wage earners employed December 15, 1909, or the nearest representative day.

STATE.	PERCENTAGE OF TOTAL NUMBER OF WAGE EARNERS IN THE INDUSTRY: 1909				
	16 years of age and over.		Under 16 years of age.		
	Male.	Female.	Total.	Male.	Female.
United States.....	28.5	70.6	0.9	0.3	0.8
Alabama.....	29.9	68.4	1.7	0.8	0.9
California.....	39.6	60.3	0.1	(¹)	(¹)
Colorado.....	28.2	71.7	0.1		0.1
Connecticut.....	34.1	64.4	1.4	0.4	1.0
District of Columbia.....	26.8	73.1	0.1	0.1	
Georgia.....	30.8	67.3	1.9	1.9	
Illinois.....	24.6	74.7	0.7	0.1	0.6
Indiana.....	25.4	74.3	0.3	0.1	0.2
Iowa.....	28.3	73.1	0.6	0.5	0.1
Kansas.....	26.6	72.8	0.6	0.3	0.3
Kentucky.....	29.9	69.2	0.9	0.1	0.8
Louisiana.....	26.5	72.4	1.0	0.3	0.7
Maryland.....	24.7	71.0	4.3	0.7	3.6
Massachusetts.....	30.8	67.9	1.3	0.4	0.9
Michigan.....	22.9	76.3	0.8	0.1	0.7
Minnesota.....	20.0	79.9	(¹)	(¹)	
Missouri.....	24.3	75.1	0.5	0.1	0.4
Nebraska.....	24.7	75.1	0.3		0.3
New Jersey.....	29.5	67.8	2.7	0.3	2.4
New York.....	29.4	70.3	0.3	0.1	0.2
Ohio.....	24.1	75.3	0.6	0.2	0.4
Oklahoma.....	32.6	67.3	0.1	0.1	
Oregon.....	25.0	74.6	0.4		0.4
Pennsylvania.....	26.5	71.5	2.0	0.4	1.6
Rhode Island.....	39.1	58.9	2.0	0.5	1.5
Tennessee.....	27.2	71.7	1.1	0.6	0.5
Texas.....	38.2	62.4	1.4	0.7	0.7
Virginia.....	30.4	69.0	0.5	0.4	0.1
Washington.....	35.0	64.8	0.1	0.1	(¹)
Wisconsin.....	23.1	75.9	0.9	0.1	0.8

¹ Less than one-tenth of 1 per cent.

Females formed two-thirds or more of the wage earners in all but five of the states for which more than 1,000 wage earners were reported. The three adjoining states of Minnesota, Michigan, and Wisconsin show the largest proportion of females, the percentages being 79.9, 77, and 76.7, respectively. The smallest proportion, 60.3 per cent, is shown for California. The proportion of children under 16 was highest, 4.3 per cent, in Maryland.

Prevailing hours of labor.—In Table 5 the wage earners employed in the industry in the leading states have been classified according to the number of hours of labor per week prevailing in the establishments in which they were employed. In making this classification, the average number of wage earners employed during the year in each establishment is classified as a total according to the hours prevailing in that establishment, even though a few employees worked a greater or less number of hours.

STATE.	Total.	In establishments with prevailing hours—						
		48 and under.	Be- tween 48 and 54.	54.	Be- tween 54 and 60.	60.	Be- tween 60 and 72.	72 and over.
United States.....	109,484	9,216	17,285	20,790	24,564	36,884	593	147
Alabama.....	1,108	35	57	192	142	682		
Arkansas.....	741	20	39	120	122	420		20
California.....	8,038	1,470	1,270	2,301	516	2,241	176	64
Colorado.....	1,833	359	415	498	204	264	89	4
Connecticut.....	1,441	160	104	227	739	211		
District of Columbia.....	993	130	222	206	245	190		
Florida.....	571		4	103	15	449		
Georgia.....	1,332	40	25		274	910	33	
Illinois.....	9,705	510	1,550	1,534	2,073	4,032		6
Indiana.....	2,901	80	195	440	921	1,257	8	
Iowa.....	2,123	115	210	339	416	1,042		1
Kansas.....	1,490	88	252	370	302	474	4	
Kentucky.....	1,554	259	542	166	170	408		9
Louisiana.....	1,036	19	34	212	16	755		
Maine.....	816	49	56	66	184	460		1
Maryland.....	1,278	39	357	136	237	509		
Massachusetts.....	5,958	806	1,075	708	3,077	292		
Michigan.....	3,729	109	947	1,574	517	582		
Minnesota.....	2,916	202	328	419	1,032	1,355		
Mississippi.....	529	39	51	10	53	334	42	
Missouri.....	5,438	328	797	2,043	546	1,724		
Montana.....	652	27	39	345	33	208		
Nebraska.....	1,110	29	84	195	115	687		
New Hampshire.....	608	18	58	63	291	178		
New Jersey.....	2,984	658	452	317	456	1,075	22	4
New York.....	12,578	831	2,269	2,095	3,809	3,551	22	1
North Carolina.....	812	13		45	39	703		9
Ohio.....	5,893	994	818	1,681	1,134	1,257	6	3
Oklahoma.....	1,101	49	99	198	285	470		
Oregon.....	1,457	37	214	534	464	208		
Pennsylvania.....	9,639	564	2,980	1,082	2,891	2,122		
Rhode Island.....	1,076	173	132	70	631	68	2	
Tennessee.....	2,149	120	333	521	444	731		
Texas.....	3,073	60	42	197	294	2,446	34	
Utah.....	738	78	335	141	102	84		
Virginia.....	1,351	97	126	60	228	804	30	6
Washington.....	3,264	134	317	417	610	1,774		12
West Virginia.....	679	40	33	223	125	258		
Wisconsin.....	2,014	119	289	462	505	636	3	

In the United States as a whole 43.2 per cent of the wage earners employed in steam laundries during 1909 were in establishments where the prevailing number of hours was 54 or less per week. Of the 7 groups shown in Table 5, the largest was that made up of the 36,884 wage earners in establishments where the prevailing hours were 60 per week, who constituted 33.7

per cent of the total number. Of the total number of wage earners employed in the industry, 82,238, or 75.1 per cent, were engaged in laundries in which the hours of employment ranged from 54 to 60, inclusive, per week, these being the most common hours in a majority of the states listed.

Wage earners employed, by months.—Table 6 gives the number of wage earners employed in the laundry industry on the 15th (or nearest representative day) of each month during the year 1909 for the 39 states in which 500 or more wage earners were employed during the year.

The largest number of wage earners reported for any month of 1909 was 114,539 in August, and the

smallest number, 103,746, in January, the minimum number forming 90.6 per cent of the maximum. The greatest number of wage earners is employed during the summer months, and the table shows that in 34 states the largest number was reported for either July, August, or September, while in 35 states the smallest number was shown for either January or February. Employment in the industry, however, is not subject to any great changes from season to season. It is probable that receipts for work done would show a greater variation from season to season than the number of employees, as adjustments in the working force can not be made to follow closely upon changes in the amount of laundry work available.

Table 6

WAGE EARNERS EMPLOYED IN THE INDUSTRY: 1909¹

STATE.	Average number during the year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
United States	109,484	103,746	103,937	104,970	106,422	108,149	111,313	114,211	114,539	113,738	111,500	110,478	110,8
Alabama.....	1,108	<i>998</i>	1,043	1,062	1,093	1,107	1,137	1,158	1,175	1,187	1,134	1,106	1,1
Arkansas.....	741	<i>681</i>	703	726	733	752	766	785	771	763	754	721	7
California.....	8,038	<i>7,632</i>	7,560	7,828	7,911	7,985	8,107	8,368	8,277	8,350	8,209	8,118	8,1
Colorado.....	1,833	<i>1,896</i>	1,684	1,707	1,756	1,763	1,844	1,996	2,046	1,962	1,855	1,850	1,8
Connecticut.....	1,441	<i>1,350</i>	1,348	1,343	1,363	1,399	1,437	1,564	1,547	1,503	1,485	1,451	1,4
District of Columbia.....	993	1,020	1,009	1,013	1,017	1,013	965	927	916	935	1,001	1,027	1,0
Florida.....	571	<i>566</i>	565	578	562	550	<i>512</i>	548	553	555	1,570	620	6
Georgia.....	1,332	<i>1,292</i>	1,285	1,303	1,318	1,325	1,342	1,366	1,367	1,366	1,351	1,342	1,3
Illinois.....	9,705	<i>9,238</i>	9,369	9,425	9,522	9,741	9,862	10,042	10,141	10,008	9,718	9,657	9,6
Indiana.....	2,901	<i>2,769</i>	2,777	2,786	2,807	2,872	2,934	2,959	2,985	2,969	2,949	2,982	2,9
Iowa.....	2,123	2,030	<i>2,024</i>	2,031	2,053	2,074	2,130	2,195	2,242	2,248	2,180	2,130	2,1
Kansas.....	1,490	<i>1,388</i>	1,363	1,401	1,440	1,449	1,499	1,549	1,558	1,582	1,551	1,556	1,5
Kentucky.....	1,554	<i>1,387</i>	1,395	1,419	1,547	1,576	1,611	1,658	1,649	1,628	1,617	1,575	1,5
Louisiana.....	1,036	<i>1,010</i>	1,029	1,030	<i>1,006</i>	1,026	1,042	1,070	1,047	1,055	1,035	1,022	1,0
Maine.....	816	<i>697</i>	701	699	764	775	851	984	1,016	911	826	778	7
Maryland.....	1,278	1,257	<i>1,252</i>	1,260	1,265	1,285	1,272	1,288	1,287	1,283	1,300	1,304	1,2
Massachusetts.....	5,958	5,671	<i>5,668</i>	5,677	5,734	5,839	6,039	6,226	6,136	6,235	6,113	6,066	6,0
Michigan.....	3,729	<i>3,434</i>	3,423	3,463	3,567	3,639	3,821	4,066	4,096	3,987	3,795	3,726	3,7
Minnesota.....	2,918	<i>2,716</i>	2,725	2,729	2,816	2,896	2,966	3,101	3,111	3,055	2,956	2,925	2,9
Mississippi.....	529	<i>496</i>	498	507	530	542	549	561	554	548	524	521	5
Missouri.....	5,438	5,199	<i>5,171</i>	5,235	5,275	5,281	5,525	5,641	5,689	5,652	5,556	5,522	5,5
Montana.....	652	<i>606</i>	597	610	631	629	663	697	710	698	667	654	6
Nebraska.....	1,110	<i>1,041</i>	1,050	1,051	1,074	1,080	1,114	1,143	1,168	1,162	1,148	1,135	1,1
New Hampshire.....	608	<i>558</i>	542	560	560	615	652	672	691	671	620	601	5
New Jersey.....	2,984	2,800	2,821	2,841	2,838	2,881	3,054	3,194	3,276	3,145	2,994	2,967	2,9
New York.....	12,578	12,129	<i>12,160</i>	12,107	12,155	12,312	12,702	13,010	13,046	12,899	12,782	12,735	12,8
North Carolina.....	812	<i>745</i>	754	756	785	815	832	877	883	871	822	736	7
Ohio.....	5,893	5,641	<i>5,686</i>	5,794	5,800	5,897	6,043	6,054	5,976	6,049	5,958	5,912	5,9
Oklahoma.....	1,101	<i>993</i>	995	1,022	1,040	1,064	1,099	1,160	1,167	1,179	1,171	1,151	1,1
Oregon.....	1,457	<i>1,371</i>	1,374	1,332	1,411	1,439	1,482	1,504	1,499	1,497	1,512	1,505	1,4
Pennsylvania.....	9,639	9,331	<i>9,357</i>	9,380	9,474	9,630	9,771	9,756	9,716	9,820	9,849	9,802	9,7
Rhode Island.....	1,076	<i>1,041</i>	1,040	1,041	1,047	1,070	1,083	1,105	1,101	1,104	1,091	1,095	1,0
Tennessee.....	2,149	<i>2,041</i>	2,039	2,059	2,130	2,117	2,196	2,236	2,226	2,183	2,189	2,171	2,1
Texas.....	3,073	<i>2,791</i>	2,847	2,891	2,891	3,048	3,160	3,232	3,234	3,232	3,172	3,112	3,0
Utah.....	738	<i>699</i>	690	690	693	700	740	814	838	759	742	742	7
Virginia.....	1,351	<i>1,283</i>	1,275	1,279	1,314	1,370	1,390	1,412	1,401	1,395	1,376	1,361	1,3
Washington.....	3,264	<i>2,946</i>	2,987	2,988	3,066	3,169	3,389	3,537	3,663	3,579	3,391	3,262	3,2
West Virginia.....	679	<i>633</i>	644	644	654	684	696	713	708	712	689	677	6
Wisconsin.....	2,014	<i>1,921</i>	1,917	1,936	1,937	1,987	2,035	2,136	2,138	2,105	2,030	2,009	2,0

¹The month of maximum employment for each state is indicated by boldface figures and that of minimum employment by italic figures.

Character of ownership.—Table 7 presents data with respect to the character of ownership of the laundries in the various states.

The most important distinction shown is that between corporate and all other forms of ownership. Of the total number of laundries covered by the census, about 22 per cent were under corporate ownership. While corporations thus controlled less than one-fourth of the total number of establishments, they gave employment to about one-half of the wage earners and reported about one-half of the total amount received for work done during the census year. Establishments operated by individuals were second in importance to

those operated by corporations, comprising 53.4 per cent of the total number of laundries, giving employment to 29.9 per cent of the wage earners, and reporting 29 per cent of the total amount received for work done. Partnerships or firms operated 24.3 per cent of the laundries, these establishments giving employment to 19.4 per cent of the total number of wage earners, and reporting 19.3 per cent of the total amount received for work done. From the standpoint of number of wage earners employed, the corporate was the most important form of ownership in all but 18 of the states, and the individual was the most important in 14 states.

Table 7

STATE.	STEAM LAUNDRIES: 1909											
	Number of establishments owned by—			Wage earners in establishments owned by—			Cost of materials in establishments owned by—			Amount received for work done in establishments owned by—		
	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.	Individuals.	Firms.	Corporations.
United States	2,770	1,258	1,158	32,754	21,245	55,485	\$5,127,488	\$3,351,873	\$9,216,899	\$30,320,840	\$20,247,268	\$54,111,978
Alabama	15	5	18	237	57	814	28,859	8,597	109,201	171,899	59,944	677,287
Arizona	7	2	4	155	(X)	128	49,610	(X)	24,543	205,983	(X)	163,299
Arkansas	22	14	9	226	243	272	39,754	43,366	39,686	201,684	225,556	256,796
California	146	56	109	1,293	1,105	5,540	243,503	215,086	1,153,523	1,608,513	1,308,952	6,629,330
Colorado	45	28	26	500	280	1,083	75,211	44,893	170,210	550,407	311,899	1,118,387
Connecticut	53	23	19	630	246	565	115,480	40,917	89,669	616,449	254,560	545,113
Delaware	9	3	3	110	60	52	16,988	7,030	5,615	90,258	49,280	47,500
District of Columbia	8	2	7	423	(X)	570	50,541	(X)	75,715	312,185	(X)	433,814
Florida	13	7	8	132	109	330	16,821	16,854	43,546	136,793	96,114	241,181
Georgia	15	10	17	275	182	875	28,159	23,515	139,980	189,983	136,631	680,110
Idaho	13	9	2	164	193	(X)	32,284	62,595	(X)	163,488	290,738	(X)
Illinois	250	100	98	2,822	1,806	5,077	515,989	285,444	920,412	2,882,566	1,784,263	5,382,622
Indiana	90	41	32	1,169	544	1,188	137,352	68,865	164,961	975,655	467,869	1,004,831
Iowa	122	39	20	904	570	649	191,591	91,549	145,631	909,688	529,575	624,188
Kansas	96	34	8	807	423	260	144,527	105,370	35,837	779,994	444,959	261,014
Kentucky	30	17	26	548	259	747	65,843	37,584	98,802	425,858	206,960	575,993
Louisiana	11	3	11	334	32	670	31,255	3,072	98,001	46,076	18,620	597,325
Maine	54	15	9	482	176	158	61,626	24,413	29,622	431,109	164,191	141,067
Maryland	19	11	11	518	164	596	53,467	15,108	87,120	391,340	125,672	476,754
Massachusetts	168	67	45	2,483	1,359	2,136	405,411	197,548	300,886	2,356,818	1,289,320	2,108,433
Michigan	137	49	33	1,084	903	1,792	184,248	114,755	322,783	882,209	730,353	1,589,279
Minnesota	99	35	24	1,091	585	1,240	202,976	99,190	212,188	1,084,675	583,597	1,237,526
Mississippi	14	9	7	177	204	148	26,083	33,581	21,309	135,706	182,189	122,484
Missouri	62	40	69	720	677	4,041	104,031	90,481	697,685	666,104	625,370	3,612,775
Montana	8	7	11	151	103	398	37,562	25,456	91,310	203,398	153,979	577,883
Nebraska	43	19	14	390	266	454	96,947	44,713	113,960	406,274	285,692	505,408
Nevada	1	1	4	(X)	(X)	105	(X)	(X)	26,915	(X)	(X)	165,037
New Hampshire	43	18	13	417	191	472	53,491	26,536	270,998	343,754	174,906	1,534,502
New Jersey	62	18	32	810	472	1,702	118,462	50,401	13,390	812,794	431,981	1,110,551
New Mexico	4	1	3	45	(X)	101	7,151	(X)	(X)	45,868	(X)	(X)
New York	292	105	111	3,442	2,141	6,995	483,635	349,595	1,023,573	3,170,473	1,981,648	6,294,542
North Carolina	18	12	13	362	137	313	48,482	19,197	40,186	228,295	104,128	227,526
North Dakota	20	9	5	201	124	109	48,791	28,542	25,079	242,880	171,470	133,825
Ohio	125	69	59	1,505	1,053	3,335	209,706	171,929	490,087	1,255,180	951,020	3,182,754
Oklahoma	47	27	19	403	315	383	83,050	55,020	62,609	468,325	345,163	384,490
Oregon	20	16	22	245	167	1,045	36,174	25,679	201,740	213,089	187,790	1,189,103
Pennsylvania	218	100	67	3,430	2,057	4,152	450,220	337,217	662,080	2,853,064	1,774,912	3,703,858
Rhode Island	28	20	5	450	223	403	66,174	53,021	39,248	388,068	229,837	401,499
South Carolina	8	8	8	75	130	168	10,552	16,834	24,379	58,975	90,142	119,995
South Dakota	16	8	4	126	158	102	26,799	37,911	17,060	144,933	178,195	99,964
Tennessee	22	22	19	408	831	910	45,165	103,981	148,545	272,739	663,876	706,792
Texas	50	41	36	721	847	1,505	108,817	112,827	249,777	688,475	866,906	1,664,834
Utah	10	3	9	85	11	642	15,067	2,533	125,441	78,813	11,250	704,028
Vermont	27	5	5	215	84	212	21,826	10,391	169,383	169,383	74,370	321,316
Virginia	28	17	12	588	366	397	72,497	43,472	57,128	412,251	269,624	321,316
Washington	86	47	39	877	543	1,844	144,784	96,782	304,979	956,631	659,519	2,198,575
West Virginia	14	11	18	177	109	393	32,815	13,615	56,127	137,693	90,337	353,835
Wisconsin	77	38	32	639	437	938	117,733	64,013	150,161	566,559	412,522	861,246
Wyoming	6	7	1	44	127	(X)	13,242	24,996	(X)	62,980	163,867	(X)

NOTE.—In some states, in order to avoid disclosing the returns for individual establishments, the figures for one group have been consolidated with those for establishments under some other form of ownership. In such cases an (X) is placed in the column from which the figures have been omitted and the figures for the group with which they have been combined are printed in italics. The figures for corporations include those for the few comparatively unimportant establishments operated by cooperative associations or under other miscellaneous forms of ownership.

Steam laundries classified according to size.—Table 8 presents statistics for laundries grouped according to the amount received for the work done.

Table 8 AMOUNT RECEIVED PER ESTABLISHMENT FOR WORK DONE.	Number of establishments.	Wage earners (average number).	Cost of materials.	Amount received for work done.
Total	5,186	109,484	\$17,696,360	\$104,680,086
Less than \$5,000	1,341	4,268	689,566	3,779,904
\$5,000 and less than \$20,000	2,359	27,522	4,215,896	25,027,052
\$20,000 and less than \$100,000	1,346	56,605	9,178,358	54,383,604
\$100,000 and over	140	21,089	3,617,540	21,489,526
Percent of total	100.0	100.0	100.0	100.0
Less than \$5,000	25.9	3.9	3.9	3.6
\$5,000 and less than \$20,000	45.5	25.1	23.8	23.9
\$20,000 and less than \$100,000	26.0	51.7	51.8	52.0
\$100,000 and over	2.7	19.3	20.4	20.5

Of the 5,186 laundries covered by the census of 1909 none reported receipts amounting to as much as \$1,000,000, and only 140, or 2.7 per cent, reported receipts amounting to \$100,000 or over. While these large establishments represented a very small proportion of the total number, they reported 20.4 per cent of the total amount received for work done. On the other hand, the small establishments, those that reported less than \$20,000 as received for work done during the year, represented 71.4 per cent of the total number, while their receipts formed 27.5 per cent of the total receipts for all laundries.

Table 9 gives a classification of the laundries in each state according to the average number of wage earners.

STATE.	STEAM LAUNDRIES EMPLOYING IN 1909—																
	TOTAL.		No wage earners.	1 to 5 wage earners.		6 to 20 wage earners.		21 to 50 wage earners.		51 to 100 wage earners.		101 to 250 wage earners.		251 to 500 wage earners.		501 to 1,000 wage earners.	
	Estab-lish-ments.	Wage earners (average number).		Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
United States	5,186	109,484	59	1,434	4,555	2,200	25,707	1,000	32,719	350	24,244	128	17,569	14	4,103	1	51
Alabama.....	38	1,108	.....	3	8	19	231	9	361	6	406	1	102	.....	.....	.....	.....
Arkansas.....	45	741	.....	14	58	20	199	8	274	3	210	.....	.....	.....	.....	.....	.....
California.....	321	8,038	9	85	254	120	1,353	58	1,976	32	2,197	17	2,258	.....	.....	.....	.....
Colorado.....	99	1,833	3	29	97	40	435	18	603	9	698	.....	.....	.....	.....	.....	.....
Connecticut.....	95	1,441	.....	29	95	43	534	22	742	1	70	.....	.....	.....	.....	.....	.....
District of Columbia.....	17	993	1	2	2	3	50	2	72	5	386	4	483	.....	.....	.....	.....
Florida.....	28	571	.....	9	30	8	101	8	269	3	171	.....	.....	.....	.....	.....	.....
Georgia.....	42	1,332	1	3	11	17	211	15	456	2	175	4	479	.....	.....	.....	.....
Illinois.....	448	9,705	4	119	390	190	2,177	96	3,234	28	1,861	9	1,204	1	252	1	58
Indiana.....	163	2,901	.....	33	120	87	952	31	999	11	728	1	102	.....	.....	.....	.....
Iowa.....	181	2,123	5	78	227	70	798	21	659	7	439	.....	.....	.....	.....	.....	.....
Kansas.....	138	1,490	4	49	142	68	745	15	457	2	146	.....	.....	.....	.....	.....	.....
Kentucky.....	73	1,554	.....	6	20	42	538	20	687	5	309	.....	.....	.....	.....	.....	.....
Louisiana.....	25	1,036	.....	4	16	8	96	6	213	4	265	3	446	.....	.....	.....	.....
Maine.....	78	816	1	34	109	35	368	7	221	.....	.....	1	118	.....	.....	.....	.....
Maryland.....	41	1,278	.....	7	24	16	177	11	389	5	380	2	308	.....	.....	.....	.....
Massachusetts.....	280	5,953	1	68	234	127	1,465	55	1,700	20	1,424	9	1,135	.....	.....	.....	.....
Michigan.....	219	3,729	6	95	272	68	806	35	1,220	10	658	5	773	.....	.....	.....	.....
Minnesota.....	158	2,916	2	51	155	66	800	24	882	14	967	1	112	.....	.....	.....	.....
Mississippi.....	30	529	.....	2	4	19	241	9	284	.....	.....	.....	.....	.....	.....	.....	.....
Missouri.....	171	5,438	3	33	83	64	808	37	1,189	24	1,716	9	1,314	1	328	.....	.....
Montana.....	26	652	.....	.....	.....	15	215	9	286	2	151	.....	.....	.....	.....	.....	.....
Nebraska.....	76	1,110	4	30	89	25	330	13	371	4	320	.....	.....	.....	.....	.....	.....
New Hampshire.....	61	608	.....	22	71	35	391	3	90	1	56	.....	.....	.....	.....	.....	.....
New Jersey.....	112	2,984	1	22	71	49	580	25	782	10	618	4	620	1	313	.....	.....
New York.....	508	12,578	4	165	531	199	2,297	73	2,500	46	3,248	16	2,426	5	1,576	.....	.....
North Carolina.....	43	812	.....	9	32	23	302	9	325	2	153	.....	.....	.....	.....	.....	.....
Ohio.....	253	5,893	1	68	214	108	1,193	52	1,698	12	961	10	1,302	2	525	.....	.....
Oklahoma.....	93	1,101	.....	23	64	55	589	15	448	.....	.....	.....	.....	.....	.....	.....	.....
Oregon.....	58	1,457	.....	14	54	25	295	10	358	7	513	2	237	.....	.....	.....	.....
Pennsylvania.....	385	9,639	1	92	314	158	1,886	92	2,905	23	1,465	17	2,502	2	567	.....	.....
Rhode Island.....	53	1,076	.....	19	59	18	191	10	302	4	270	2	254	.....	.....	.....	.....
Tennessee.....	63	2,149	.....	8	28	26	284	14	416	11	749	3	394	1	278	.....	.....
Texas.....	127	3,073	.....	28	94	47	585	40	1,295	10	820	2	276	.....	.....	.....	.....
Utah.....	22	738	1	8	22	5	77	4	168	3	207	.....	.....	1	264	.....	.....
Virginia.....	57	1,351	.....	3	10	30	335	17	543	6	362	1	101	.....	.....	.....	.....
Washington.....	172	3,264	4	49	154	75	889	29	966	10	632	5	623	.....	.....	.....	.....
West Virginia.....	43	679	1	6	23	23	261	12	329	1	66	.....	.....	.....	.....	.....	.....
Wisconsin.....	147	2,014	1	53	165	64	771	24	742	5	336	.....	.....	.....	.....	.....	.....

Of the 5,186 laundries reported, there were 59 in which no wage earners were employed. Some of these small establishments were operated in accordance with a cooperative arrangement under which two or more persons did all of the work and shared the profits. There were only 143 laundries in which more than 100 wage earners were employed. Of the 8 groups of establishments, the largest consisted of those with from 6 to 20 wage earners, but the greatest number of wage earners was reported for the 1,000 establishments in which from 21 to 50 wage earners were employed.

Expenses of steam laundries.—As stated in the Introduction, the census figures for expenses do not purport to represent the total cost of the operation of the laundries, since they take no account of depreciation, and consequently they can not properly be used for determining profits. Facts of interest can be brought out, however, concerning the relative importance of the different classes of expenses which were reported. Table 1 shows the total expenses reported by laundries to have been \$85,187,604, divided as follows:

Materials, \$17,696,360, or 20.8 per cent; services including all salaries and wages, \$53,007,747, or 62.1 per cent; and miscellaneous expenses, made up of advertising, ordinary repairs of buildings and machinery, rent, insurance, keep of animals and repair of vehicles, expenses of agencies, and other sundries, \$14,483,497 or 17 per cent.

Table 10 shows for each state the percentage of the total expenses represented, respectively, by salaries, wages, cost of materials, and miscellaneous expenses.

Payments for salaries and wages together comprised more than three-fifths of the total expenses of the operation of laundries, the percentage of such expenses in the different states ranging from 50.5 per cent in North Dakota to 68.2 per cent in Montana. The cost of materials also forms an important item of expense, ranging from 16 per cent of the total in New Mexico to 29 per cent in Idaho. The percentages for miscellaneous expenses range from 9.4 in Idaho to 25.5 in Maryland.

The total primary power used in laundries amounted to 123,477 horsepower. Steam was the most important kind of power reported, the power of steam engines amounting to 105,272 horsepower and forming 85.3 per cent of the total primary power used in the industry. Rented electric power (motors run by purchased current) was next in importance, with 11,157 horsepower, or 9 per cent of the total. This form of power was used to some extent by laundries in all of the states except Nevada. In a large majority of the states electric motors were also used for the distribution of power by means of electric current generated in the same establishment. The states which ranked highest with respect to the total primary power used were New York, Illinois, Pennsylvania, California, and Ohio, the largest amount, 12,637 horsepower, being reported for New York.

Fuel consumed.—Closely related to the question of the kind of power employed in laundries is that of the fuel consumed in generating this power, or otherwise used in the industry. Fuel is one of the important items of expense in the conduct of a laundry. Table 11 shows that coal was the principal class of fuel used, the laundries consuming 1,065,374 tons during 1909. Oil and gas were also used to a considerable extent, by far the largest quantity of oil being consumed in California and the largest quantity of gas in Ohio.

Laundries in cities.—Laundries are naturally located in places where a considerable local population is to be served. All of the establishments returned at the

census of 1909 were in cities or in towns of considerable size. Table 12 shows the more important statistics of laundries located in cities and towns of 10,000 inhabitants or over in comparison with those located outside such places.

	STEAM LAUNDRIES: 1909				
	Total.	In cities having a population of 10,000 or over.		In districts outside of cities having a population of 10,000 or over.	
		Number or amount.	Per cent of total.	Number or amount.	Per cent of total.
Number of establishments..	5,186	3,104	59.9	2,082	40.1
Total number of persons engaged in the industry...	124,214	103,503	83.3	20,711	18.7
Wage earners (average number).....	109,484	92,233	84.2	17,251	15.8
Wages.....	\$44,826,978	\$38,274,513	85.4	\$6,552,465	14.6
Amount received for work done.....	\$104,680,086	\$88,428,911	84.5	\$16,251,175	15.5

This table shows that 59.9 per cent of the total number of laundries reported were located in cities having a population of 10,000 or over. These establishments employed 83.3 per cent of the total number of persons reported as engaged in the industry, and reported 84.5 per cent of the total receipts for work done.

Data for each city having 10,000 inhabitants or over in 1910, so far as they can be presented without disclosing the operations of individual establishments, are given in Table 13.

STATISTICS FOR CITIES WITH A POPULATION OF 10,000 OR OVER: 1909.

STATE AND CITY.	Number of establishments.	Persons engaged in the industry.	Wage earners (average number).	Wages.	Amount received for work done.	STATE AND CITY.	Number of establishments.	Persons engaged in the industry.	Wage earners (average number).	Wages.	Amount received for work done.
Total for 557 cities¹.....	3,104	103,503	92,233	\$38,274,513	\$88,428,911	FLORIDA:					
ALABAMA:						Jacksonville.....	6	248	229	\$62,973	\$167,726
Birmingham.....	11	684	608	217,031	521,761	Pensacola.....	3	86	78	18,863	46,067
Mobile.....	4	191	182	44,002	120,183	Tampa.....	4	130	120	62,932	138,465
Montgomery.....	3	124	106	28,614	90,863	GEORGIA:					
ARIZONA:						Atlanta.....	10	775	663	175,680	516,816
Phoenix.....	3	90	82	38,038	97,077	Macon.....	3	120	111	27,898	69,275
ARKANSAS:						Savannah.....	4	222	199	79,865	157,568
Fort Smith.....	3	98	88	31,541	79,151	IDAHO:					
Hot Springs.....	3	105	93	39,280	106,600	Boise.....	3	81	74	37,909	87,623
Little Rock.....	6	282	282	103,949	253,413	ILLINOIS:					
CALIFORNIA:						Aurora.....	5	105	93	41,496	78,784
Alameda.....	9	105	89	44,168	109,066	Bloomington.....	4	145	133	51,766	127,380
Berkeley.....	5	102	90	47,934	103,733	Champaign.....	3	44	34	12,482	27,323
Eureka.....	4	59	49	28,938	65,687	Chicago.....	228	7,321	6,601	3,133,790	7,108,126
Fresno.....	4	98	93	67,300	130,651	Danville.....	3	116	102	37,111	109,439
Long Beach.....	3	93	83	37,490	85,785	Decatur.....	6	136	120	44,496	97,256
Los Angeles.....	31	2,385	2,209	1,201,049	2,364,051	East St. Louis.....	3	91	70	31,159	86,780
Oakland.....	41	993	845	468,218	1,066,514	Elgin.....	3	63	55	24,681	53,922
Pasadena.....	3	210	177	99,257	225,991	Evanston.....	7	148	133	64,112	164,058
Sacramento.....	10	293	259	155,511	333,755	Galesburg.....	4	88	78	30,795	64,543
San Diego.....	8	251	230	102,873	228,997	Jacksonville.....	3	45	38	10,572	32,060
San Francisco.....	87	2,257	2,001	1,268,299	2,683,235	Joliet.....	4	79	67	28,560	85,978
San Jose.....	7	200	170	103,665	193,781	Moline.....	5	71	59	24,930	65,500
Santa Barbara.....	4	61	54	33,235	60,731	Peoria.....	7	295	263	104,084	239,158
Stockton.....	7	173	180	82,235	187,149	Quincy.....	5	185	161	37,449	117,317
COLORADO:						Rock Island.....	5	62	46	19,543	63,038
Colorado Springs.....	4	197	185	90,045	177,973	Rockford.....	8	160	145	48,419	118,060
Denver.....	36	1,174	1,049	628,889	1,172,363	Springfield.....	6	275	252	89,816	227,868
Pueblo.....	6	182	168	76,473	144,073	Waukegan.....	3	52	47	21,470	44,985
CONNECTICUT:						INDIANA:					
Bridgeport.....	7	166	150	59,451	158,031	Evansville.....	7	304	280	93,093	206,368
Danbury.....	4	80	71	30,505	58,676	Fort Wayne.....	3	133	122	46,463	107,881
Hartford.....	12	278	248	110,903	262,916	Hammond.....	3	51	46	20,634	54,088
Meriden.....	4	64	58	23,798	55,480	Indianapolis.....	23	973	883	319,666	748,258
New Haven.....	16	318	282	121,627	276,926	Kokomo.....	3	37	33	12,450	23,230
New London.....	5	65	60	13,816	38,854	Lafayette.....	3	70	61	22,189	61,408
Norwich.....	3	56	50	18,039	59,671	Logansport.....	3	80	73	25,902	58,235
Stamford.....	4	65	56	18,627	49,187	Marion.....	3	53	39	15,172	46,609
Waterbury.....	7	111	97	38,317	87,941	Michigan City.....	3	44	40	12,357	39,327
DELAWARE:						Muncie.....	3	65	62	21,560	48,200
Wilmington.....	11	257	201	65,393	164,960	Richmond.....	4	82	54	15,860	44,742
DISTRICT OF COLUMBIA:						South Bend.....	6	162	146	53,941	114,844
Washington.....	17	1,096	993	347,793	795,999	Terre Haute.....	5	160	138	52,565	119,012
						Vincennes.....	3	64	55	16,680	42,210

¹ Includes the cities shown in note on page 896, with establishments as there indicated, statistics for which can not be shown separately without disclosing individual operations.

STATISTICS FOR CITIES WITH A POPULATION OF 10,000 OR OVER: 1909—Continued.

Table 13—Continued.											
STATE AND CITY.	Number of establishments.	Persons engaged in the industry.	Wage earners (average number).	Wages.	Amount received for work done.	STATE AND CITY.	Number of establishments.	Persons engaged in the industry.	Wage earners (average number).	Wages.	Amount received for work done.
TENNESSEE:						WASHINGTON:					
Chattanooga	6	335	298	\$100,055	\$251,693	Bellingham	6	122	114	\$52,833	\$105,452
Jackson	3	55	49	16,662	46,095	Everett	7	103	88	45,232	113,691
Knoxville	7	257	218	77,722	156,410	Seattle	51	1,520	1,327	765,079	1,697,325
Memphis	8	892	837	282,750	634,289	Spokane	23	648	575	328,245	680,391
Nashville	10	535	476	125,378	364,494	Tacoma	14	426	385	189,828	399,739
TEXAS:						WEST VIRGINIA:					
Austin	3	96	71	24,664	68,757	Charleston	4	86	75	31,361	62,801
Beaumont	3	146	117	59,249	175,527	Huntington	3	62	55	18,196	41,208
Dallas	6	400	364	146,026	401,091	Parkersburg	3	106	93	32,128	78,688
Denison	3	44	36	16,735	33,684	Wheeling	5	185	172	62,969	147,039
El Paso	5	185	160	53,754	167,532	WISCONSIN:					
Fort Worth	9	366	341	157,197	328,558	Appleton	3	21	18	7,412	18,220
Galveston	3	145	126	56,805	136,578	Beloit	3	49	43	13,476	40,943
Houston	9	463	422	224,395	499,705	Janesville	3	56	50	17,786	40,143
San Antonio	8	360	301	103,287	339,007	Kenosha	4	56	50	20,652	57,336
Waco	5	214	205	74,402	135,300	La Crosse	4	132	122	43,624	120,702
UTAH:						WISCONSIN:					
Ogden	4	117	110	53,388	111,577	Madison	3	123	109	44,426	122,158
Salt Lake City	7	605	554	258,188	610,330	Manitowoc	3	24	19	5,818	16,813
VERMONT:						WISCONSIN:					
Burlington	3	75	70	21,123	46,876	Milwaukee	33	920	817	320,223	712,054
Rutland	3	34	29	13,135	27,238	Oshkosh	3	51	45	14,492	37,696
VIRGINIA:						WYOMING:					
Lynchburg	3	166	146	35,119	105,401	Cheyenne	3	84	75	34,070	91,483
Norfolk	6	227	203	67,021	186,228						
Petersburg	3	53	42	13,907	34,140						
Richmond	9	430	397	141,114	295,814						
Roanoke	4	92	81	24,440	65,838						

NOTE.—The cities referred to in footnote 1 on page 894, with the number of establishments in each, are as follows:

ALABAMA:	LOUISIANA:	NEBRASKA:	PENNSYLVANIA—Continued.
Anniston	Alexandria	Grand Island	Carnegie
Gadsden	Baton Rouge	South Omaha	Chambersburg
Selma	Lake Charles	Reno	Coatesville
ARIZONA:	Monroe	NEW HAMPSHIRE:	Columbia
Tucson	Shreveport	Berlin	Connellsville
ARKANSAS:	MAINE:	Laconia	Dubois
Pine Bluff	Auburn	NEW JERSEY:	Greensburg
CALIFORNIA:	Augusta	Bayonne	Hazleton
Bakersfield	Biddeford	Bloomfield	Homestead
Pomona	Waterville	Hackensack	Johnstown
Redlands	MARYLAND:	Irrvington	McKeesport
Riverside	Frederick	Montclair	Mahanoy City
San Bernardino	Hagerstown	Morristown	Monessen
Santa Cruz	MASSACHUSETTS:	New Brunswick	Mount Carmel
Vallejo	Adams	Perth Amboy	Nanticoke
COLORADO:	Attleborough	Phillipsburg	Norristown
Trinidad	Brookline	Union	Oil City
CONNECTICUT:	Chelsea	West New York	Phoenixville
Ansonia	Everett	NEW MEXICO:	Pittston
Middletown	Framingham	Albuquerque	Plymouth
New Britain	Gardner	NEW YORK:	Pottstown
Torrington	Gloucester	Batavia	Shamokin
Wallingford	Greenfield	Cohoes	Sharon
Willimantic	Leominster	Corning	South Bethlehem
FLORIDA:	Marlborough	Cortland	Steelton
Key West	Medford	Dunkirk	Uniontown
GEORGIA:	Melrose	Fulton	Warren
Athens	Methuen	Hornell	Washington
Augusta	Milford	Hudson	West Chester
Brunswick	North Adams	Little Falls	Wilksburg
Columbus	Peabody	Lockport	RHODE ISLAND:
Rome	Pittsfield	Middletown	Central Falls
Waycross	Plymouth	New Rochelle	SOUTH CAROLINA:
ILLINOIS:	Southbridge	North Tonawanda	Columbia
Alton	Watertown	Ossining	Spartanburg
Belleville	Webster	Peekskill	TEXAS:
Cairo	Westfield	Plattsburg	Cleburne
Canton	Weymouth	Port Chester	Palestine
Chicago Heights	Winthrop	Saratoga Springs	Paris
Freeport	Woburn	Watervliet	San Angelo
Kankakee	MICHIGAN:	White Plains	Sherman
La Salle	Alpena	NORTH CAROLINA:	Temple
Lincoln	Bay City	Durham	Tyler
Mattoon	Escanaba	Greensboro	VERMONT:
Oak Park	Holland	OHIO:	Barre
Streator	Ironwood	Alliance	VIRGINIA:
INDIANA:	Ishpeming	Ashtabula	Alexandria
Anderson	Manistee	Bellaire	Danville
Elkhart	Marquette	Cambridge	Newport News
Elwood	Menominee	Chillicothe	Portsmouth
Gary	Pontiac	Elyria	Staunton
Huntington	Sault Ste. Marie	Findlay	WASHINGTON:
Jeffersonville	Traverse City	Ironton	Aberdeen
Laporte	MINNESOTA:	Lancaster	North Yakima
Mishawaka	Mankato	Lima	WEST VIRGINIA:
New Albany	St. Cloud	Massillon	Bluefield
Peru	Stillwater	Middletown	Martinsburg
IOWA:	Virginia	Newark	WISCONSIN:
Boone	MISSISSIPPI:	Portsmouth	Ashland
Clinton	Hattiesburg	Sandusky	Eau Claire
Fort Dodge	Jackson	Chickasha	Fond du Lac
Marshalltown	Meridian	Guthrie	Green Bay
Mason City	Natebeez	McAlester	Marquette
Ottumwa	Vicksburg	Shawnee	Sheboygan
KANSAS:	MISSOURI:	OREGON:	Superior
Coffeyville	Hannibal	Salem	Wausau
Fort Scott	Jefferson City	PENNSYLVANIA:	
Hutchinson	Moberly	Braddock	
KENTUCKY:	Webb City	Bradford	
Covington	MONTANA:	Butler	
Frankfort	Anaconda	Carbondale	
Henderson	Billings		
Newport	Helena		

It is probable that laundries of some character existed in all of the 601 cities and towns that had a population of 10,000 or over in 1910, but steam laundries were reported for only 557 of these places. There were only six cities in which as many as 2,000 persons were engaged in the laundry industry, or in which the receipts for work done during the year amounted to \$2,000,000 or over. These cities, in the order of their importance as measured by receipts for work done, were Chicago, Ill., New York, N. Y., Philadelphia, Pa., San Francisco, Cal., Los Angeles, Cal., and St. Louis, Mo. The population of New York was more than double that of Chicago, but the receipts for laundry work in steam laundries were only about three-fourths as great. The population of St. Louis was 687,029, while that of San Francisco and Los Angeles was 416,912 and 319,198, respectively, though both of these cities outranked St. Louis in receipts for laundry work. There were, however, 2,722 persons

engaged in the industry in St. Louis, as compared with 2,385 in Los Angeles and 2,257 in San Francisco. Boston, which ranked fifth in population, having 670,585 inhabitants in 1910, ranked tenth in the laundry industry in 1909. In addition to the cities named, Cleveland, Baltimore, Pittsburgh, Detroit, and Buffalo all have a larger population than San Francisco, and yet San Francisco outranked all of them in its laundries. Los Angeles is the seventeenth city in population, but in 1909 ranked fifth in the amount received for laundry work, and fifth in the number of persons engaged in the laundry industry. It is probable that in some cities a larger proportion of the laundry work is done by hand laundries, the statistics for which are not included in this report, than in others.

Detailed statistics, by states.—The statistics secured by the census inquiry concerning laundries are presented in detail, by states, in Table 14.

Table 14		PERSONS ENGAGED IN THE INDUSTRY.										WAGE EARNERS—DEC. 15, OR NEAREST REPRESENTATIVE DAY.					Primary horse-power.
STATE.	Number of establishments.	Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks.		Wage earners.			Total.	16 and over.		Under 16.				
					Male.	Female.	Average number.	Number, 15th day of—			Male.	Female.	Male.	Female.			
								Maximum month.	Minimum month.								
1	United States.....	5,186	124,214	6,560	3,019	2,837	3,314	109,484	Au 114,539	Ja 103,746	112,084	31,947	79,152	274	691	123,477	
2	Alabama.....	38	1,274	26	49	64	27	1,108	Se 1,187	Ja 998	1,104	330	755	9	10	1,041	
3	Arizona.....	13	309	11	9	2	4	283	De ¹ 291	Au 266	291	80	211	.....	.....	298
4	Arkansas.....	45	850	53	23	17	16	741	Jy 795	Ja 681	747	218	523	4	2	900	
5	California.....	321	9,060	308	223	306	185	8,038	Jy 8,366	Fe 7,560	8,216	3,258	4,953	3	2	8,961	
6	Colorado.....	99	2,076	103	37	45	58	1,833	Au 2,046	Fe 1,684	1,865	525	1,338	.....	2	1,895
7	Connecticut.....	95	1,638	101	44	19	33	1,441	Jy 1,564	Fe 1,342	1,457	497	939	6	15	1,852	
8	Delaware.....	15	283	17	8	20	18	222	Jy ¹ 228	Ja ¹ 215	236	43	193	.....	.....	235
9	District of Columbia.....	17	1,096	13	26	10	64	993	De 1,069	Au 916	1,069	287	781	1	.....	998
10	Florida.....	28	638	28	20	9	10	571	De 647	Je 642	647	199	438	2	8	628	
11	Georgia.....	42	1,525	37	45	77	34	1,332	Au 1,367	Fe 1,285	1,294	399	871	24	.....	1,180
12	Idaho.....	24	410	31	14	1	7	357	Au 372	Ja 338	374	114	259	1	.....	489
13	Illinois.....	448	10,916	470	261	186	294	9,705	Au 10,141	Ja 9,288	9,802	2,414	7,323	6	59	10,780	
14	Indiana.....	163	3,308	184	106	34	83	2,901	Au 2,985	Ja 2,769	2,978	756	2,212	4	6	3,746	
15	Iowa.....	181	2,468	206	52	17	70	2,133	Se 2,248	Fe 2,024	2,180	574	1,504	10	2	2,941	
16	Kansas.....	138	1,751	168	26	39	28	1,430	Se 1,562	Ja ¹ 1,388	1,542	410	1,123	5	4	1,958	
17	Kentucky.....	73	1,749	67	48	31	49	1,554	Jy 1,658	Ja 1,387	1,593	477	1,102	1	13	2,139	
18	Louisiana.....	25	1,117	19	27	16	19	1,036	Jy 1,070	Ap 1,005	1,059	281	767	3	8	1,109	
19	Maine.....	78	956	87	25	6	22	816	Au 1,016	Ja 697	806	288	633	1	4	1,085	
20	Maryland.....	41	1,497	44	43	52	30	1,278	No 1,304	Fe 1,252	1,285	318	912	9	46	1,091	
21	Massachusetts.....	280	6,655	313	133	79	172	5,958	Se 6,285	Fe 5,668	6,176	1,901	4,193	25	56	6,802	
22	Michigan.....	219	4,328	249	97	115	138	3,729	Au 4,096	Fe 3,423	3,758	862	2,866	3	27	4,071	
23	Minnesota.....	158	3,333	187	60	85	90	2,916	Au 3,111	Ja 2,715	2,961	693	2,367	1	.....	2,319
24	Mississippi.....	30	603	32	22	9	11	629	Jy 561	Ja 495	519	145	360	10	4	621	
25	Missouri.....	171	6,113	152	157	150	216	5,438	Au 5,689	Fe 5,171	5,025	1,368	4,227	7	23	5,727	
26	Montana.....	26	723	24	21	14	12	652	Au 710	Fe 597	662	182	480	.....	.....	651
27	Nebraska.....	76	1,314	84	46	46	28	1,110	Au 1,168	Ja 1,041	1,155	285	867	.....	3	1,510
28	Nevada.....	5	119	2	8	2	2	105	Ja 112	No 100	110	43	67	.....	1	149
29	New Hampshire.....	61	706	82	5	1	10	608	Au 691	Ja 536	626	223	401	1	1	938	
30	New Jersey.....	112	3,334	101	66	101	82	2,984	Au 3,276	Ja 2,800	3,008	888	2,088	9	73	3,917	
31	New Mexico.....	8	168	6	7	1	8	146	Oc 164	Fe 133	145	41	102	.....	2	146
32	New York.....	508	14,063	523	336	227	399	12,578	Au 13,046	Mh 12,107	13,043	3,837	9,164	12	30	12,637	
33	North Carolina.....	43	924	43	34	16	19	812	Au 833	Ja 745	839	281	534	11	13	1,000	
34	North Dakota.....	34	503	39	10	12	8	434	Au 460	Ja 394	466	99	365	2	.....	606
35	Ohio.....	253	6,773	277	176	206	221	5,893	Se 6,069	Fe 5,626	6,019	1,451	4,534	9	25	7,431	
36	Oklahoma.....	93	1,301	105	48	27	20	1,101	Se 1,179	Ja 993	1,173	333	789	1	.....	1,484
37	Oregon.....	58	1,674	54	43	67	53	1,457	Oc 1,512	Ja 1,371	1,497	374	1,117	.....	6	1,685
38	Pennsylvania.....	385	10,915	436	212	305	323	9,639	Oc 9,849	Ja 9,331	9,855	2,610	7,048	39	158	10,730	
39	Rhode Island.....	53	1,211	70	22	4	39	1,076	Jy 1,105	Fe 1,040	1,122	439	661	5	17	1,268	
40	South Carolina.....	24	440	26	19	12	10	373	Jy 392	Au 361	392	124	260	3	5	691	
41	South Dakota.....	28	447	33	10	11	7	386	Au 414	Ja ¹ 352	403	92	307	1	3	619	
42	Tennessee.....	63	2,392	68	52	74	49	2,149	Au 2,246	Fe 2,039	2,220	603	1,592	13	12	1,863	
43	Texas.....	127	3,514	150	90	147	54	3,073	Au 3,284	Ja 2,791	3,196	1,157	1,995	21	23	3,195	
44	Utah.....	22	811	16	31	7	19	738	Au 838	Fe ¹ 690	750	177	571	.....	2	969
45	Vermont.....	32	342	37	.....	1	6	299	Jy 337	Fe 269	297	81	215	.....	1	349
46	Virginia.....	57	1,523	63	42	26	41	1,351	Jy 1,412	Fe 1,275	1,353	412	934	5	2	1,199	
47	Washington.....	172	3,731	195	85	92	95	3,264	Au 3,663	Ja 2,946	3,240	1,135	2,101	3	1	3,084	
48	West Virginia.....	43	793	41	37	11	25	679	Jy 713	Ja 633	697	195	495	1	6	1,045	
49	Wisconsin.....	147	2,332	159	68	35	66	2,014	Au 2,138	Fe 1,917	2,036	471	1,546	3	16	2,373	
50	Wyoming.....	14	203	20	6	3	3	171	Au 185	Fe 159	177	47	129	.....	1	319

¹Same number reported for one or more other months.

STEAM LAUNDRIES.

STATISTICS, BY STATES: 1909.

	Capital.	EXPENSES.										Amount received for work done.
		Total.	Services.			Materials.		Miscellaneous.				
			Officials.	Clerks.	Wage earners.	Fuel and rent of power.	Other.	Rent of factory.	Taxes, including internal revenue.	Contract work.	Other.	
1	\$68,035,226	\$85,187,604	\$4,507,076	\$3,673,693	\$44,826,878	\$5,131,532	\$12,564,828	\$2,276,840	\$500,031	\$239,090	\$11,467,536	\$104,660,086
2	545,892	789,656	66,218	60,361	343,183	49,978	105,679	36,291	6,580	1,874	128,492	909,130
3	193,951	303,206	11,830	4,400	163,467	35,029	39,124	10,580	1,319	.....	47,407	369,282
4	568,411	523,658	31,995	18,537	269,279	43,287	79,519	6,085	3,000	1,000	70,956	684,036
5	6,295,915	8,177,759	330,488	459,258	4,471,017	470,202	1,141,910	142,081	42,571	51,428	1,068,824	9,541,795
6	1,270,656	1,595,638	72,530	77,677	905,354	74,973	216,341	52,223	10,341	5,780	181,519	1,980,693
7	870,567	1,069,900	73,478	28,057	584,838	72,817	173,249	31,412	5,152	.....	122,897	1,416,122
8	103,026	149,363	9,668	16,264	71,844	10,264	19,369	6,373	.....	.....	16,297	187,038
9	699,007	686,057	43,674	27,918	347,793	36,003	90,253	6,979	4,903	.....	128,634	795,999
10	461,038	371,750	25,480	10,850	196,589	28,239	48,982	9,645	2,107	.....	60,138	474,088
11	654,756	832,036	61,110	70,787	384,198	54,936	136,718	26,620	6,157	.....	92,630	1,006,724
12	252,110	327,375	18,709	3,912	179,215	35,361	59,518	5,405	1,756	1,200	22,300	394,226
13	5,540,003	8,239,441	441,913	277,073	4,316,666	449,242	1,272,603	253,166	80,698	6,064	1,190,016	10,049,445
14	1,236,060	1,937,297	137,465	64,418	1,020,675	119,069	252,109	71,135	8,543	12,799	261,084	2,448,355
15	1,261,954	1,617,551	68,016	39,484	806,489	146,252	282,519	52,569	8,402	3,462	210,356	2,063,451
16	1,026,904	1,105,239	29,678	37,651	566,423	76,394	209,340	31,996	8,349	9,610	135,798	1,485,967
17	730,112	967,610	64,743	34,520	519,442	52,714	149,615	35,106	8,219	.....	108,851	1,208,811
18	795,657	679,382	55,923	27,410	363,945	36,603	95,825	6,038	.....	287	85,100	852,021
19	636,361	540,777	24,085	12,667	298,338	52,905	63,056	18,233	4,012	787	66,844	736,367
20	643,458	834,814	58,501	69,495	348,573	43,172	112,523	18,651	5,441	100	188,358	983,766
21	2,951,025	4,745,135	203,391	132,985	2,582,593	273,665	630,189	137,768	28,607	26,167	729,849	5,754,572
22	2,009,251	2,594,945	136,656	135,477	1,327,818	166,188	456,598	72,642	16,691	3,191	277,684	3,281,841
23	1,821,191	2,223,019	98,330	111,993	1,132,851	163,160	351,194	81,459	13,794	3,058	267,180	2,855,738
24	332,302	318,354	28,776	10,149	162,983	26,887	54,086	4,332	4,153	.....	26,988	440,579
25	3,407,985	4,167,030	235,856	192,407	2,135,742	193,808	698,389	97,897	17,096	10,277	679,558	4,904,249
26	677,089	764,904	37,260	27,105	457,643	59,012	95,416	17,980	5,372	.....	65,116	935,260
27	871,600	946,140	66,500	50,967	436,778	73,890	181,730	17,103	4,816	889	113,467	1,197,374
28	166,131	150,181	12,740	3,160	82,129	11,085	15,828	3,000	1,201	.....	21,038	185,037
29	303,013	379,299	4,750	4,781	223,555	32,429	47,598	14,529	1,676	2,187	47,795	518,660
30	2,137,243	2,187,794	104,711	104,698	1,185,926	115,563	324,298	57,910	13,451	1,640	279,597	2,779,277
31	164,187	128,344	8,500	3,955	65,243	8,725	11,756	780	932	.....	28,453	156,419
32	7,316,808	9,483,116	552,788	316,415	5,212,128	559,638	1,297,065	328,125	44,963	9,457	1,162,557	11,446,663
33	424,642	435,951	37,310	16,209	211,519	41,857	66,008	10,201	4,190	261	48,396	559,949
34	444,817	413,161	9,393	10,973	188,126	44,379	58,033	8,995	4,567	5,466	83,229	548,175
35	3,802,957	4,425,294	274,649	238,309	2,259,179	218,880	652,842	92,582	30,000	23,874	634,979	5,388,954
36	781,531	928,217	47,102	28,688	487,995	65,521	135,158	25,365	8,270	541	129,677	1,197,978
37	991,017	1,252,614	63,546	97,001	684,767	76,946	186,647	24,315	8,902	.....	110,490	1,569,982
38	6,685,132	6,821,427	331,095	349,748	3,486,993	348,450	1,101,067	135,022	51,038	20,007	998,007	8,331,834
39	612,524	841,748	40,702	21,059	461,284	45,871	112,572	18,599	3,219	916	137,526	1,019,404
40	183,975	207,717	18,156	12,188	87,428	21,468	30,297	8,452	2,173	2,645	24,910	269,112
41	336,276	313,492	12,124	10,740	167,966	37,201	44,599	8,430	1,986	.....	30,476	423,092
42	1,283,583	1,340,732	75,600	62,080	673,533	65,008	232,688	33,681	16,222	6,612	176,313	1,643,407
43	2,005,200	2,629,766	118,624	142,574	1,295,801	164,760	306,661	59,512	13,702	6,085	524,097	3,220,315
44	500,276	684,434	52,769	19,948	342,592	31,927	111,114	3,569	3,966	360	118,189	794,091
45	144,393	155,436	.....	3,024	101,745	16,245	15,972	6,672	798	233	10,747	243,753
46	835,607	786,733	58,046	31,523	414,377	49,419	123,678	14,504	8,048	296	86,842	1,003,161
47	2,165,715	3,046,673	133,369	141,688	1,757,646	181,750	364,795	99,787	13,793	11,892	342,153	3,814,825
48	415,216	462,687	39,401	16,418	242,922	24,840	77,217	17,698	2,529	906	41,757	581,865
49	1,379,730	1,435,389	75,608	51,430	736,557	119,749	212,158	45,293	10,133	.....	184,461	1,840,327
50	99,573	149,361	5,860	4,532	78,911	15,171	23,067	4,947	871	.....	16,002	216,847

METROPOLITAN DISTRICTS

NEW YORK CITY	CLEVELAND
CHICAGO	BUFFALO
PHILADELPHIA	DETROIT
PITTSBURGH	CINCINNATI
BOSTON	BALTIMORE
ST. LOUIS	MINNEAPOLIS-ST. PAUL
SAN FRANCISCO-OAKLAND	

STATISTICS OF MANUFACTURES FOR METROPOLITAN DISTRICTS.

CITIES AND THEIR SUBURBS.

The metropolitan districts for which statistics are presented in this report include not only the area within the corporate limits of the city but also parts of the surrounding territory which may in a general way be regarded as closely associated with the development of the city. Statistics as to the population of important urban centers, which are termed "metropolitan districts," have been published in the Thirteenth Census bulletin entitled "Population of Cities," and the boundaries of the districts as there defined have been adopted for the presentation of statistics relative to manufactures. Although these districts were not defined on an industrial basis, it is believed that they include most of the important factories which are intimately connected with the growth of the central cities.

In many cases manufacturing establishments of considerable size are located just outside the boundaries of cities. Such sites are purposely chosen by manufacturers who wish to secure all the advantages of an urban location, such as a plentiful supply of labor, good shipping facilities, and the like, and at the same time escape as many as possible of the expenses and restrictions which they would incur in building their plants within the city limits. The corporate limits of some cities have been extended so as to take in important manufacturing suburbs, while the boundaries of other towns have remained unchanged, although important manufacturing suburbs have developed. When city limits are established or extended the boundaries are in many instances fixed in such a way as to leave outside certain plants which would be expected to come within the city limits. Obviously, the statistics for a city alone do not always accurately represent its importance from an industrial standpoint. It follows, therefore, that the exact importance of a city as a manufacturing center can be ascertained only by combining with the statistics for establishments actually located in the city, figures for the neighboring manufacturing establishments identified or closely associated with its industrial development.

Method of defining districts.—The metropolitan district as defined for the census of 1910, in a general way consists of the city, together with the civil divisions of urban character lying within 10 miles of the city limits. Divisions which lie partly within and partly without the 10-mile limit are included if either one-half of their total population or one-half of their

total area comes within that limit. State boundaries are disregarded, so that in some cases the metropolitan district lies partly in two states. The area within the 10-mile limit thus defined is, of course, a very different thing from the area of a circle having as its radius a line extending 10 miles from the center of the city; nor is it the area bounded by a line drawn parallel to the city boundary at an exact distance of 10 miles, because in mapping out the district no civil divisions can be subdivided. Hence the outline of the area does not follow geometrical lines, but conforms to the boundaries of the political divisions which are on the outer edge of the included area. Owing to this fact, the boundaries of the adjacent territory thus defined sometimes vary considerably in their actual distance from the city lines. The area considered in this report is the net area, or land surface only.

Districts for which statistics are presented.—The statistics for 13 districts only are shown in the report, as the retabulation necessary to make a similar presentation of the figures for all metropolitan districts in the United States is impracticable. The metropolitan districts were selected for this presentation according to their population.

The central cities of the districts selected are, in the order of the importance of the districts as manufacturing centers, as follows: New York, Chicago, Philadelphia, Pittsburgh, Boston, St. Louis, Cleveland, Buffalo, Detroit, Cincinnati, Baltimore, Minneapolis and St. Paul, and San Francisco and Oakland. The districts are presented in the same order in the report.

Comparison with earlier censuses.—This report is a continuation of a similar report prepared in connection with the census of manufactures of 1904 (Bulletin 101, Industrial Districts, 1905), which contains statistics for 1904 and 1899 for 13 "industrial" districts. The central cities represented in the earlier bulletin are the same as those in the present report, except that Providence was included while Detroit was not.

Owing to the fact that different methods were employed in mapping out "metropolitan" and "industrial" districts, the area of the metropolitan district in 1909 is in most cases very different from that of the industrial district in 1904 and 1899. Since in the case of Boston a strict application of the rule used for determining metropolitan districts at the population census of 1910 would have given an area almost identical with the area of the industrial district of Boston in 1904 and 1899, the latter area was for conveni-

ence of comparison considered as the metropolitan district. The same was true of New York City, except that Nassau County, and a part of the town of Rye, N. Y., which were not included in the industrial district, were added to the metropolitan district, and Maywood borough, N. J., which was in the industrial district, was not included in the metropolitan district. In the case of the other industrial districts shown in the bulletin mentioned, the areas were so different from the metropolitan districts, as determined by the application of the rule described above, that no attempt was made to secure conformity.

On account of the differences in the areas as defined for the two reports, it was deemed advisable, in compiling the tables showing totals for the districts at the various censuses, to segregate the figures for the territory added and that deducted since 1904 and to compute increases only on the basis of the figures for the area which was comprised in the district at both censuses. In the comparison of selected industries, however, it was deemed best, except for the Pittsburgh district, to make no segregation of the figures for the territory added or deducted since 1904, as only a few of these industries were greatly affected; allusions to such will be found in the text.

Summary of the statistics.—Although the main purpose of this report is to bring out the importance of the individual districts as manufacturing centers in separate sections devoted to each, some interest and significance attach to the summarized statistics as presented in Tables 1, 2, and 3. Table 1 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the 13 districts combined, for the central cities, and for the remainder of the territory comprised in these districts. The percentage which the figure for the combined cities represents of the total for all districts is shown in the case of each item.

Table 1

	THIRTEEN METROPOLITAN DISTRICTS: 1909			
	Total.	Central cities.	Districts exclusive of central cities.	Per cent central cities are of total for districts.
Population ¹	18,326,338	13,848,151	4,478,187	75.6
Number of establishments.....	78,437	66,135	12,302	84.3
Persons engaged in manufactures.....	2,789,034	2,115,967	673,067	75.9
Proprietors and firm members.....	78,196	67,113	11,083	85.8
Salariated employees.....	363,120	294,272	68,848	81.0
Wage earners (average number).....	2,347,718	1,754,582	593,136	74.7
Primary horsepower.....	4,442,233	2,640,197	1,802,036	59.4
Capital.....	\$7,056,832,487	\$4,984,843,416	\$2,072,489,071	70.6
Expenses.....	7,768,863,123	5,639,226,724	2,069,636,399	73.4
Services.....	1,768,942,349	1,347,549,736	421,392,613	76.2
Salaries.....	446,192,628	358,536,706	87,655,922	80.4
Wages.....	1,322,749,721	988,956,030	333,793,691	74.8
Materials.....	5,126,778,739	3,644,934,395	1,481,784,344	71.1
Miscellaneous.....	873,142,035	706,682,593	166,459,442	80.9
Value of products.....	8,658,267,349	6,371,374,946	2,286,892,403	73.6
Value added by manufacture.....	3,531,488,610	2,726,380,551	805,108,059	77.2

¹ April 15, 1910.

By reference to Table 3, page 905, it will be seen that in 1909 the 13 metropolitan districts combined embraced 3,416,019 acres (approximately 5,338 square miles). Of this amount 733,158 acres represented the area of the cities and 2,682,861 acres that of the outside territory.

In 1909 the combined districts had 78,437 manufacturing establishments, which gave employment to an average of 2,789,034 persons during the year and paid out \$1,768,942,349 in salaries and wages. Of the persons employed, 2,347,718 were wage earners. These establishments turned out products to the value of \$8,658,267,349, to produce which materials costing \$5,126,778,739 were utilized. The value added by manufacture was thus \$3,531,488,610, which figure best represents the net wealth created by manufacturing operations during the year.

The percentages which the statistics for the group of central cities represent of the totals for the districts range from 59.4 per cent for primary horsepower to 85.8 per cent for proprietors and firm members. The central cities contained 75.6 per cent of the population of the districts in 1910 and contributed 73.6 per cent of the value of manufactured products in 1909.

Comparison with United States totals.—Table 2 is a summary of the statistics of manufacturing industries in 1909 and of the population in 1910 for the United States and for the group of 13 metropolitan districts, together with the percentages which this group reported of the totals for the United States.

Table 2

	United States.	THIRTEEN METROPOLITAN DISTRICTS: 1909	
		Number or amount.	Per cent of total for United States.
Population ¹	91,972,266	18,326,338	19.9
Number of establishments.....	268,491	78,437	29.2
Persons engaged in manufactures.....	7,678,578	2,789,034	36.3
Proprietors and firm members.....	273,265	78,196	28.6
Salariated employees.....	790,267	363,120	45.9
Wage earners (average number).....	6,615,046	2,347,718	35.5
Primary horsepower.....	18,675,376	4,442,233	23.8
Capital.....	\$18,428,269,706	\$7,056,832,487	38.3
Expenses.....	18,454,089,599	7,768,863,123	42.1
Services.....	4,366,612,851	1,768,942,349	40.5
Salaries.....	938,574,967	446,192,628	47.5
Wages.....	3,427,037,884	1,322,749,721	38.6
Materials.....	12,142,790,878	5,126,778,739	42.2
Miscellaneous.....	1,945,685,870	873,142,035	44.9
Value of products.....	20,672,051,870	8,658,267,349	41.9
Value added by manufacture.....	8,529,260,992	3,531,488,610	41.4

¹ April 15, 1910.

Of the total number of manufacturing establishments in the United States in 1909 (268,491), 78,437, or 29.2 per cent, were in the 13 metropolitan districts, and these establishments contributed products valued at \$8,658,267,349, or 41.9 per cent of the total value of products for the United States. These districts are collectively more important from the industrial standpoint than from that of population. Their combined population represented 19.9 per cent of the

total for the United States in 1910, while the percentages for the items relating to manufactures for 1909 range from 23.8 for primary horsepower to 47.5 for salaries.

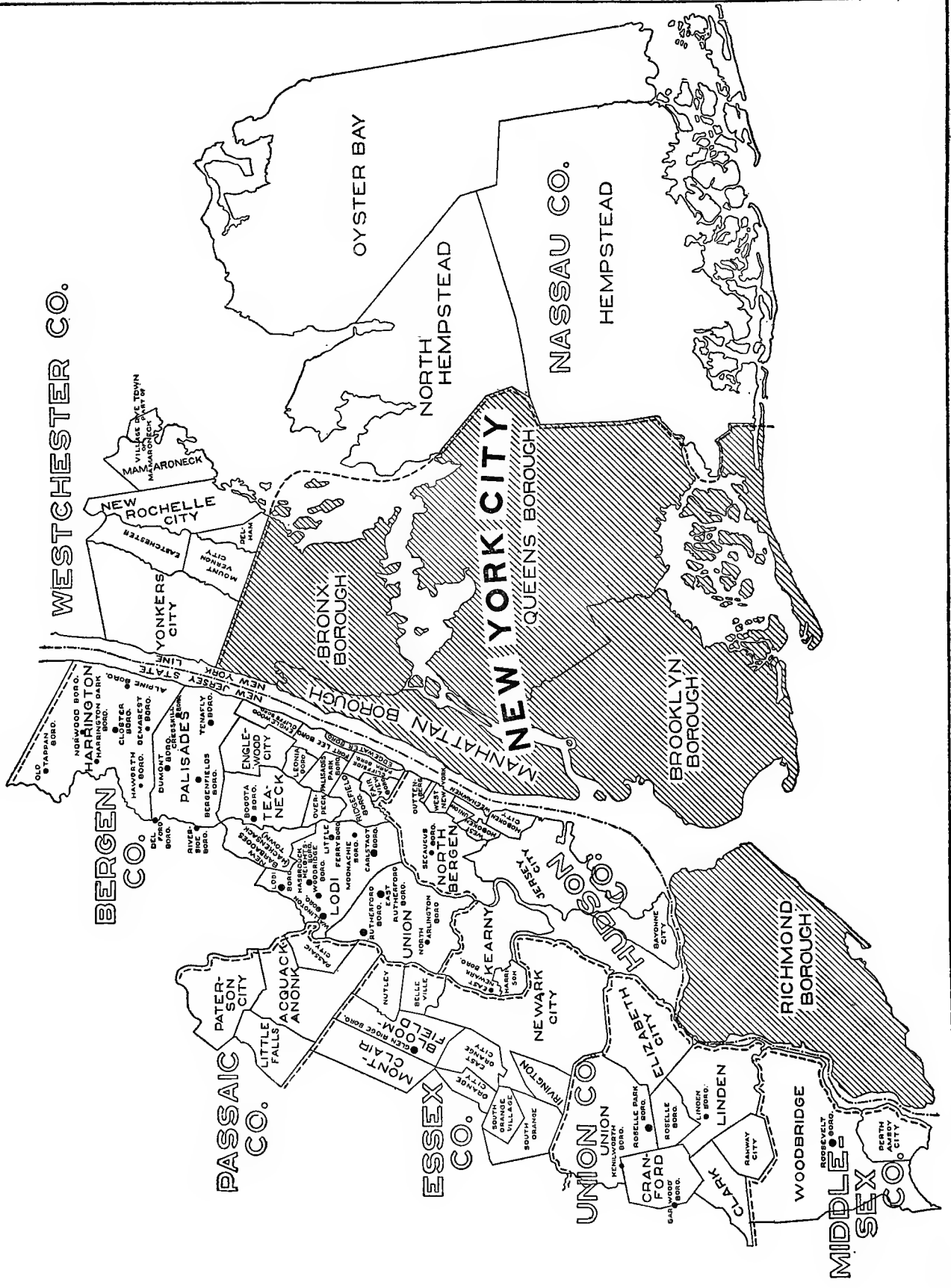
Table 3 is a detailed statement of the statistics of manufactures, population, and area, as reported at the Thirteenth Census for each of the metropolitan districts included in the report.

MANUFACTURES, POPULATION, AND AREA FOR THIRTEEN SELECTED METROPOLITAN DISTRICTS: 1909.

METROPOLITAN DISTRICT.	Population. ¹	Area in acres.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
				Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
Total	18,328,338	3,416,019	78,437	2,789,034	78,196	363,120	2,347,718	4,442,233	\$7,058,832	\$448,183	\$1,322,750	\$5,126,779	\$873,142	\$8,658,267	\$3,531,488
New York.....	6,474,568	616,928	31,782	948,706	34,476	125,056	789,175	820,413	2,117,433	159,275	448,480	1,710,325	342,295	2,970,143	1,259,818
Chicago.....	2,446,921	409,087	10,202	393,859	8,600	59,335	325,924	739,229	1,144,003	71,161	195,466	870,587	135,243	1,408,780	538,193
Philadelphia.....	1,972,342	437,733	9,568	358,218	10,263	39,008	308,947	497,453	863,969	46,619	154,314	629,992	79,849	911,014	381,022
Pittsburgh.....	1,044,743	405,880	2,369	163,258	2,102	20,692	140,464	791,047	642,527	24,934	90,116	368,892	37,878	578,816	211,923
Boston.....	1,520,470	335,905	5,389	214,641	4,989	23,700	185,952	223,886	444,558	29,074	103,321	315,771	55,036	564,055	248,284
St. Louis.....	828,733	197,993	2,951	126,453	2,045	17,873	106,535	228,925	356,356	22,613	59,545	286,552	45,429	430,170	163,618
Cleveland.....	613,270	103,174	2,230	103,709	1,771	12,850	89,088	216,166	236,911	16,150	50,655	159,897	27,865	281,992	122,096
Buffalo.....	488,661	132,413	1,964	75,086	1,638	9,876	63,572	322,280	280,053	11,190	36,173	180,468	22,109	279,852	99,394
Detroit.....	500,982	96,554	2,104	101,482	1,865	13,596	86,021	136,480	210,402	16,028	46,010	137,848	28,322	268,900	131,052
Cincinnati.....	563,804	111,772	2,827	95,571	2,593	12,646	80,332	140,254	212,556	15,602	41,736	139,107	37,094	260,400	121,293
Baltimore.....	658,715	184,660	2,668	94,954	2,790	10,339	81,825	125,080	199,735	11,888	36,697	165,086	23,899	260,213	95,127
Minneapolis-St. Paul.....	526,256	94,539	1,844	59,920	1,674	9,978	48,268	119,219	160,628	10,872	27,725	166,823	20,069	244,340	77,517
San Francisco-Oakland.....	686,873	289,381	2,539	53,177	3,390	8,172	41,615	81,821	187,701	10,787	32,512	117,441	18,054	199,593	82,152

¹ April 15, 1910.

NEW YORK CITY METROPOLITAN DISTRICT: 1908.



NEW YORK CITY METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of New York City embraces 616,928 acres of territory, of which 183,555 acres constitute the area of New York, and 433,373 acres the area of the outside territory. The population of the city of New York in 1910 was 4,766,883, and that of the outside territory 1,707,685, the total for the district being 6,474,568.

As defined at the census of 1910, the metropolitan district includes in addition to the central city 15 cities, 41 boroughs, 2 villages, 17 towns, and 17 townships. The following is a list by states and counties of the various primary divisions included in the metropolitan district for 1909. Nassau County, N. Y., and that part of Mamaroneck village, in the town of Rye, have been added to the area since 1904; and the borough of Maywood, N. J., has been deducted from it.

NEW YORK.

New York City, comprising Kings, New York, Queens, and Richmond Counties.

NASSAU COUNTY.

Hempstead town.	Oyster Bay town.
North Hempstead town.	

WESTCHESTER COUNTY.

Eastchester town.	New Rochelle city.
Mamaroneck town.	Pelham town.
Mamaroneck village.	Yonkers city.
Mount Vernon city.	

NEW JERSEY.

BERGEN COUNTY.

Alpine borough.	Hasbrouck Heights borough.
Bergenfields borough.	Haworth borough.
Bogota borough.	Leonia borough.
Carlstadt borough.	Little Ferry borough.
Cliffside Park borough.	Lodi borough.
Closter borough.	Lodi township.
Cresskill borough.	Moonachie borough.
Delford borough.	North Arlington borough.
Demarest borough.	Norwood borough.
Dumont borough.	Old Tappan borough.
East Rutherford borough.	Overpeck township.
Edgewater borough.	Palisades township.
Englewood city.	Palisades Park borough.
Englewood Cliffs borough.	Ridgefield borough.
Fairview borough.	Riverside borough.
Fort Lee borough.	Rutherford borough.
Hackensack town (coextensive with New Barbadoes township).	Teaneck township.
Harrington township.	Tenafly borough.
Harrington Park borough.	Union township.
	Wallington borough.
	Woodridge borough.

NEW JERSEY—Continued.

ESSEX COUNTY.

Belleville township.	Newark city.
Bloomfield town.	Nutley town.
East Orange city.	Orange city.
Glen Ridge borough.	South Orange township.
Irvington town.	South Orange village.
Montclair town.	

HUDSON COUNTY.

Bayonne city.	North Bergen township.
East Newark borough.	Secaucus borough.
Guttenberg town.	Union town.
Harrison town.	Weehawken township.
Hoboken city.	West Hoboken town.
Jersey City.	West New York town.
Kearny town.	

MIDDLESEX COUNTY.

Perth Amboy city (coextensive with Perth Amboy township).	Roosevelt borough.
	Woodbridge township.

PASSAIC COUNTY.

Acquackanonk township.	Passaic city.
Little Falls township.	Paterson city.

UNION COUNTY.

Clark township.	Linden township.
Cranford township.	Rahway city.
Elizabeth city.	Roselle borough.
Garwood borough.	Roselle Park borough.
Kenilworth borough.	Union township.
Linden borough.	

On page 906 is an outline map of the metropolitan district as constituted in 1909, showing the various primary divisions included.

Summary for the district.—Table 4 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the New York City metropolitan district, for 22 incorporated places and for the remainder of the district. The percentage which the figure for New York City represents of the total for the district is shown in the case of each item.

In 1909 the New York City metropolitan district had 31,782 manufacturing establishments, which gave employment to an average of 948,706 persons during the year, and paid out \$607,755,267 in salaries and wages. Of the persons employed, 789,175 were wage earners. These establishments turned out products

to the value of \$2,970,143,382, to produce which materials costing \$1,710,324,660 were utilized. The value added by manufacture was thus \$1,259,818,722. The New York City district ranked first in 1909 among all the metropolitan districts of the United States in the value of its manufactured products.

In the New York City district the greater part of the value of the manufactured products of the district was reported by factories within the central city,

which is the leading commercial city and the industrial metropolis of the United States. New York City contained nearly three-fourths (73.6 per cent) of the population of the district in 1910, and contributed more than two-thirds (68.3 per cent) of the value of products in 1909. Its manufacturing establishments constituted over four-fifths (81.6 per cent) of all in the district and gave employment to more than seven-tenths of the wage earners (70.2 per cent).

Table 4

	Population. ¹	Number of establishments.	PERSONS ENGAGED IN MANUFACTURES.				Primary horsepower.	Capital.
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).		
The district.....	6,474,568	31,732	943,706	34,476	125,055	739,175	820,413	\$2,117,433,047
New York City.....	4,766,883	25,938	680,510	29,055	97,453	554,002	429,003	1,364,352,683
District exclusive of New York City—total.....	1,707,685	5,844	263,196	5,421	27,602	235,173	391,410	753,080,364
Mount Vernon.....	30,919	90	1,492	76	209	1,207	1,590	3,201,654
New Rochelle.....	28,867	42	882	39	108	735	620	1,377,185
Yonkers.....	79,803	153	13,746	150	885	12,711	16,978	58,768,555
Bayonne.....	55,545	97	8,790	34	1,187	7,519	28,094	62,280,685
Bloomfield.....	15,070	45	3,435	35	443	2,957	6,031	7,768,644
East Orange.....	34,371	42	1,861	45	430	1,386	1,087	3,849,230
Elizabeth.....	73,409	163	13,670	132	801	12,737	20,124	26,773,807
Hackensack.....	14,050	46	873	44	91	733	1,021	1,845,897
Harrison.....	14,498	54	7,339	33	806	6,500	8,021	20,602,053
Hoboken.....	70,324	244	9,339	206	1,033	8,100	11,108	19,898,095
Irvington.....	11,877	51	656	40	76	540	967	1,405,795
Jersey City.....	267,779	745	30,239	614	4,171	25,454	35,917	79,793,932
Kearny.....	18,659	18	3,111	14	277	2,820	5,879	6,551,151
Montclair.....	21,650	23	321	17	52	252	1,245	1,104,570
Newark.....	347,469	1,858	69,986	1,704	8,327	59,955	78,263	154,232,686
Orange.....	29,630	85	5,054	65	606	4,383	5,962	11,147,977
Passaic.....	54,773	169	16,386	145	1,155	15,086	23,245	42,840,818
Paterson.....	125,600	702	35,116	871	2,241	32,004	35,889	66,401,725
Perth Amboy.....	32,121	80	6,595	55	674	5,866	22,314	25,100,426
Union.....	21,023	83	3,155	83	178	2,894	3,034	10,910,251
West Hoboken.....	35,403	137	3,179	154	243	2,782	1,477	4,861,242
West New York.....	13,560	66	1,779	70	201	1,508	1,443	4,162,662
Remainder.....	311,385	846	31,192	745	3,408	27,039	81,101	138,201,324
Per cent New York City is of total for district.....	73.6	81.6	71.7	84.3	77.9	70.2	52.3	64.4

	EXPENSES.						Value of products.	Value added by manufacture.
	Aggregate.	Services.			Materials.	Miscellaneous.		
		Total.	Salaries.	Wages.				
The district.....	\$2,680,374,379	\$607,755,267	\$159,275,011	\$448,480,256	\$1,710,324,660	\$342,294,952	\$2,970,143,382	\$1,259,818,722
New York City.....	1,803,961,431	445,771,857	122,073,725	323,698,132	1,092,155,333	266,034,241	2,029,692,576	937,537,243
District exclusive of New York City—total.....	856,413,448	161,983,410	37,201,286	124,782,124	618,169,327	76,260,711	940,450,806	322,281,479
Mount Vernon.....	2,618,139	1,010,518	209,007	801,511	1,285,557	322,064	3,376,415	2,090,858
New Rochelle.....	1,530,439	594,831	113,118	481,713	814,140	121,465	1,668,724	854,584
Yonkers.....	54,491,098	8,024,498	1,298,380	6,726,118	43,201,919	3,264,681	59,333,865	16,131,946
Bayonne.....	69,354,728	6,537,438	1,762,181	4,775,257	58,932,541	3,884,749	73,640,900	14,708,359
Bloomfield.....	5,485,678	1,891,323	590,790	1,300,533	2,300,773	1,293,582	5,894,710	3,593,937
East Orange.....	3,296,385	1,122,402	264,423	857,979	1,767,000	406,383	3,724,879	1,957,279
Elizabeth.....	26,560,257	8,565,061	1,052,344	7,512,717	16,428,569	1,566,627	29,147,334	12,718,765
Hackensack.....	1,787,311	478,674	118,504	360,170	899,340	409,297	1,977,966	1,078,626
Harrison.....	11,241,701	4,597,295	925,134	3,672,161	5,413,473	1,230,933	13,142,377	7,728,904
Hoboken.....	17,735,572	5,917,896	1,364,984	4,552,912	9,469,108	2,348,568	20,413,015	10,943,907
Irvington.....	2,806,290	380,529	102,656	277,873	2,343,001	82,760	3,017,824	674,823
Jersey City.....	120,141,941	18,264,200	5,048,633	13,215,567	89,317,227	12,560,514	128,774,978	39,457,751
Kearny.....	7,415,452	1,809,477	269,132	1,540,345	5,263,062	342,913	8,306,276	3,043,214
Montclair.....	982,042	182,472	43,711	138,761	668,579	130,991	1,025,585	357,006
Newark.....	181,530,641	44,852,938	11,777,343	33,075,595	114,679,408	21,998,295	202,511,520	87,832,112
Orange.....	8,362,617	3,235,190	772,282	2,462,908	3,688,432	1,438,995	9,175,910	5,487,478
Passaic.....	35,018,909	8,052,870	1,783,955	6,268,915	24,334,845	2,631,194	41,729,257	17,394,412
Paterson.....	62,876,266	18,135,459	2,980,915	15,204,544	34,727,598	9,963,209	69,584,351	34,856,753
Perth Amboy.....	69,109,510	3,665,330	986,001	2,679,329	63,932,054	1,512,126	73,092,703	20,160,649
Union.....	6,827,482	1,640,485	229,669	1,410,816	3,538,585	1,648,412	7,941,047	4,402,462
West Hoboken.....	4,860,311	1,692,857	267,930	1,424,927	2,488,025	679,429	5,577,439	3,089,414
West New York.....	8,953,573	965,826	236,588	729,238	7,408,709	579,038	9,273,717	1,865,008
Remainder.....	153,427,106	20,315,841	5,003,606	15,312,235	125,266,782	7,844,483	168,120,014	42,853,232
Per cent New York City is of total for district.....	67.8	73.3	76.6	72.2	63.9	77.7	68.3	74.4

¹ April 15, 1910.

Of the places outside of New York City for which statistics are given separately, Newark had the largest value of products in 1909, representing 6.8 per cent of the total for the metropolitan district. The population of Newark in 1910 formed 5.4 per cent of the total for the district.

The part of the district that was outside the cities and towns for which separate figures are given, with an aggregate population equal to 4.8 per cent of the total for the district, contributed 5.7 per cent of the value of the products.

The value of the manufactured products of New York City in 1909 was nearly 60 per cent greater than was reported by Chicago, the city next in rank in this respect, and it was also greater than the value of products reported by any state other than New York, with the exception of Pennsylvania. New York City ranked first in value of products among the cities of the United States in 5 of the 15 leading manufacturing industries of the United States, namely, the making of women's clothing, with over two-thirds (69.3 per cent) of the total for the United States; the making of men's clothing, including shirts, with 38.4 per cent of the total; printing and publishing, with 24.9 per cent; the bakery industry, with 15.6 per cent; and the manufacture of tobacco products, with 15 per cent.

The 22 cities and towns in the district exclusive of New York City for which separate statistics are shown in the table together reported 26 per cent of the value of products for the district in 1909 and a somewhat lower proportion of the population in 1910—22 per cent. In these cities and towns, which are mentioned here according to rank in value of products, the leading industry or industries were as follows: Newark, the smelting and refining of copper, the tanning, currying, and finishing of leather, foundries and machine shops, the manufacture of jewelry, and the brewery industry; Jersey City, slaughtering and meat packing, the manufacture of tobacco products, the gas and soap industries, the refining of sugar, and the refining of petroleum; Bay-

onne, the refining of petroleum and smelting and refining from clippings, sweepings, and scrap; Perth Amboy, the smelting and refining of copper and the manufacture of wire; Paterson, the silk-goods industry and the dyeing and finishing of textiles; Yonkers, the refining of sugar and the manufacture of carpets and rugs; Passaic, the manufacture of woolen and worsted goods and of cotton goods; Elizabeth, the sewing-machine industry and the manufacture of wire; Hoboken and Harrison, foundries and machine shops; West New York, the refining of lard and the manufacture of cottonseed oil and cake; Orange, the manufacture of phonographs and graphophones and of fur-felt hats; Kearny, slaughtering and meat packing and the manufacture of oilcloth and linoleum; Union, the silk-goods industry; Bloomfield, the manufacture of electrical machinery, apparatus, and supplies; West Hoboken, the silk-goods industry; East Orange, the manufacture of electrical machinery, apparatus, and supplies; Mount Vernon, the manufacture of brass and bronze products; Irvington, the reducing and refining of gold and silver from clippings, sweepings, and scrap; Hackensack, the silk-goods industry; New Rochelle, printing and publishing; and Montclair, the paper-goods industry.

Considerable industrial activity was manifested in 1909 by some of the places for which statistics are not shown separately. Among these were the following, with leading industries as stated: Weehawken, the manufacture of electrical machinery, apparatus, and supplies and of wall paper; Garwood, electrical machinery, apparatus, and supplies; Lodi, the dyeing and finishing of textiles; Belleville, the manufacture of fur-felt hats and of brass and bronze products; Rahway, printing and publishing and the manufacture of steel castings; Edgewater, the chemical industry; and Nutley, the manufacture of cutlery and of artificial leather.

Comparison with earlier censuses.—Table 5 is a comparative summary of the statistics for 1909, 1904, and 1899, together with the percentages of increase.

	1909			1904			1899			PER CENT OF INCREASE.		
	Total.	Territory added since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹	1899-1909	1904-1909	1899-1904
Population.....	2 6, 474, 568	86, 215	2 6, 388, 353	2 5, 294, 682	2 687	2 5, 293, 995	2 4, 539, 390	2 536	2 4, 538, 854	40.7	20.7	16.6
Number of establishments.....	31, 782	186	31, 596	25, 257	4	25, 253	23, 262	3	23, 259	35.8	25.1	8.6
Persons engaged in manufactures	948, 706	1, 398	947, 308	764, 330	138	764, 192	(²)	85	(²)	24.0	.....	.....
Proprietors and firm members	34, 476	212	34, 264	28, 870	.....	28, 870	(²)	.....	(²)	18.7	.....	.....
Salaried employees.....	125, 055	86	124, 969	80, 472	16	80, 456	54, 864	7	54, 857	127.8	55.3	46.7
Wage earners (average number).....	789, 175	1, 100	788, 075	654, 988	122	654, 866	539, 630	78	539, 612	46.0	20.3	21.4
Primary horsepower.....	820, 413	2, 524	817, 889	578, 371	605	577, 766	(²)	(²)	(²)	.....	41.6	.....
Capital.....	\$2, 117, 433, 047	\$3, 839, 007	\$2, 113, 594, 040	\$1, 572, 628, 947	\$585, 677	\$1, 572, 043, 270	\$1, 224, 823, 447	\$189, 884	\$1, 224, 633, 563	72.6	34.4	28.4
Expenses.....	2, 660, 374, 879	2, 134, 631	2, 658, 240, 248	1, 905, 102, 665	568, 804	1, 904, 533, 861	1, 404, 978, 582	162, 636	1, 404, 815, 946	89.2	39.6	35.6
Services.....	607, 755, 267	691, 479	607, 063, 788	436, 238, 272	101, 154	436, 137, 118	332, 657, 663	46, 306	332, 611, 357	82.5	39.2	31.1
Salaries.....	159, 275, 011	80, 861	159, 194, 150	94, 547, 089	37, 534	94, 509, 555	66, 057, 921	14, 800	66, 043, 121	141.0	68.4	43.1
Wages.....	448, 480, 256	610, 618	447, 869, 638	341, 691, 183	63, 620	341, 627, 563	266, 599, 742	31, 506	266, 568, 236	68.0	31.1	28.2
Materials.....	1, 710, 324, 660	1, 255, 292	1, 709, 069, 368	1, 209, 010, 634	398, 892	1, 208, 611, 742	910, 389, 938	99, 203	910, 290, 735	87.7	41.4	32.8
Miscellaneous.....	342, 294, 952	187, 860	342, 107, 092	259, 853, 759	68, 758	259, 785, 001	161, 930, 951	17, 127	161, 913, 854	111.3	31.7	60.4
Value of products.....	2, 970, 143, 382	2, 568, 790	2, 967, 574, 592	2, 144, 488, 093	692, 229	2, 143, 795, 864	1, 614, 267, 347	229, 948	1, 614, 037, 399	83.9	38.4	32.8
Value added by manufacture.....	1, 259, 818, 722	1, 313, 498	1, 258, 505, 224	935, 477, 459	293, 337	935, 184, 122	703, 877, 409	130, 745	703, 746, 664	78.8	34.6	32.9

¹ Figures in this column used in computing percentages of increase.
² April 15, 1910.

³ State censuses of June 1, 1905.
⁴ June 1, 1900.

⁵ Figures not available.

For purpose of accurate comparison the statistics for 1909 have been adjusted by segregating the figures of the territory added since 1904; and those for 1904 and 1899 by segregating the figures for the territory deducted since 1904.

The percentages of increase in all items, except average number of wage earners and miscellaneous expenses, were greater during the later five-year period 1904-1909 than during the period 1899-1904. The percentages of increase during the decade were especially large for salaries, salaried employees, and miscellaneous expenses. The average number of wage earners increased 46 per cent, wages 68 per cent, and the value of products 83.9 per cent.

The rate of increase from 1904 to 1909 in the amount of primary horsepower used was 41.6 per cent. Statistics as to the primary power used in 1899 are not available.

The proportions of the population and manufactures in the outside territory of the metropolitan district are in general increasing, as is indicated by the percentages in Table 6.

Table 6

	PER CENT TERRITORY OUTSIDE OF NEW YORK CITY IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904 ²	1899 ²
Population.....	25.4	24.2	24.3
Number of establishments.....	17.9	17.5	17.3
Persons engaged in manufactures.....	28.2	27.6	(³)
Proprietors and firm members.....	15.2	14.6	(³)
Salaried employees.....	22.0	21.0	20.2
Wage earners (average number).....	29.7	29.0	28.0
Primary horsepower.....	47.5	44.1	(³)
Capital.....	35.4	33.7	30.3
Expenses.....	32.1	29.3	27.8
Services.....	26.6	26.4	25.3
Salaries.....	23.3	22.7	21.8
Wages.....	27.7	27.4	26.2
Materials.....	36.1	32.3	30.3
Miscellaneous.....	22.2	20.4	18.6
Value of products.....	31.6	28.8	27.3
Value added by manufacture.....	25.5	24.2	23.5

¹ Based on figures for district as constituted in 1909, exclusive of territory added since 1904.

² Based on figures for district as constituted in 1904, exclusive of territory deducted since 1904.

³ Figures not available.

The proportion of the population of the district reported from the territory outside of New York City increased from 24.3 per cent in 1900 to 25.4 per cent in 1910; while the proportion of the value of products increased from 27.3 per cent in 1899 to 28.8 per cent in 1904 and 31.6 per cent in 1909.

Leading industries.—Table 7 (p. 911) gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

Among the industries shown separately in the table there are 20 for which totals for the district can not be published, because to do so would disclose individual operations; and 3 which were not carried on in the part of the district which is outside the corporate

limits of New York City. In the case of all but 3 of the 20 industries of the former class the statistics shown are figures for New York City exclusively.

The leading industry of the New York metropolitan district in 1909 was the manufacture of women's clothing. The 3,058 establishments engaged in the industry there in that year reported products valued at \$270,646,086, or 9.1 per cent of the value of products of all industries in the district. The manufacture of men's clothing, including shirts, ranked next, with 2,630 establishments and products valued at \$224,943,048, or 7.6 per cent of the total. Other important industries, with the value of their products, were: Printing and publishing, \$194,486,953; slaughtering and meat packing, \$131,081,148; foundries and machine shops, \$107,297,665; the manufacture of tobacco products, \$78,783,942; the bakery industry, \$77,472,491; the manufacture of silk goods, including the operations of throwsters, \$74,570,282; the brewery industry, \$72,850,405; the making of millinery and lace goods, \$56,072,956.

Among the more important industries that can not be shown separately without disclosing the operations of individual establishments are the smelting and refining of copper, the refining of sugar, the refining of petroleum, the roasting and grinding of coffee, the smelting and refining of lead, the manufacture of carpets and rugs other than rag, of wire, of flour-mill and gristmill products, and of sewing machines and attachments, lapidary work, the manufacture of lead pencils, of oilcloth and linoleum, and the distillation of liquors. Four of these had products in 1909 valued at very much more than \$10,000,000.

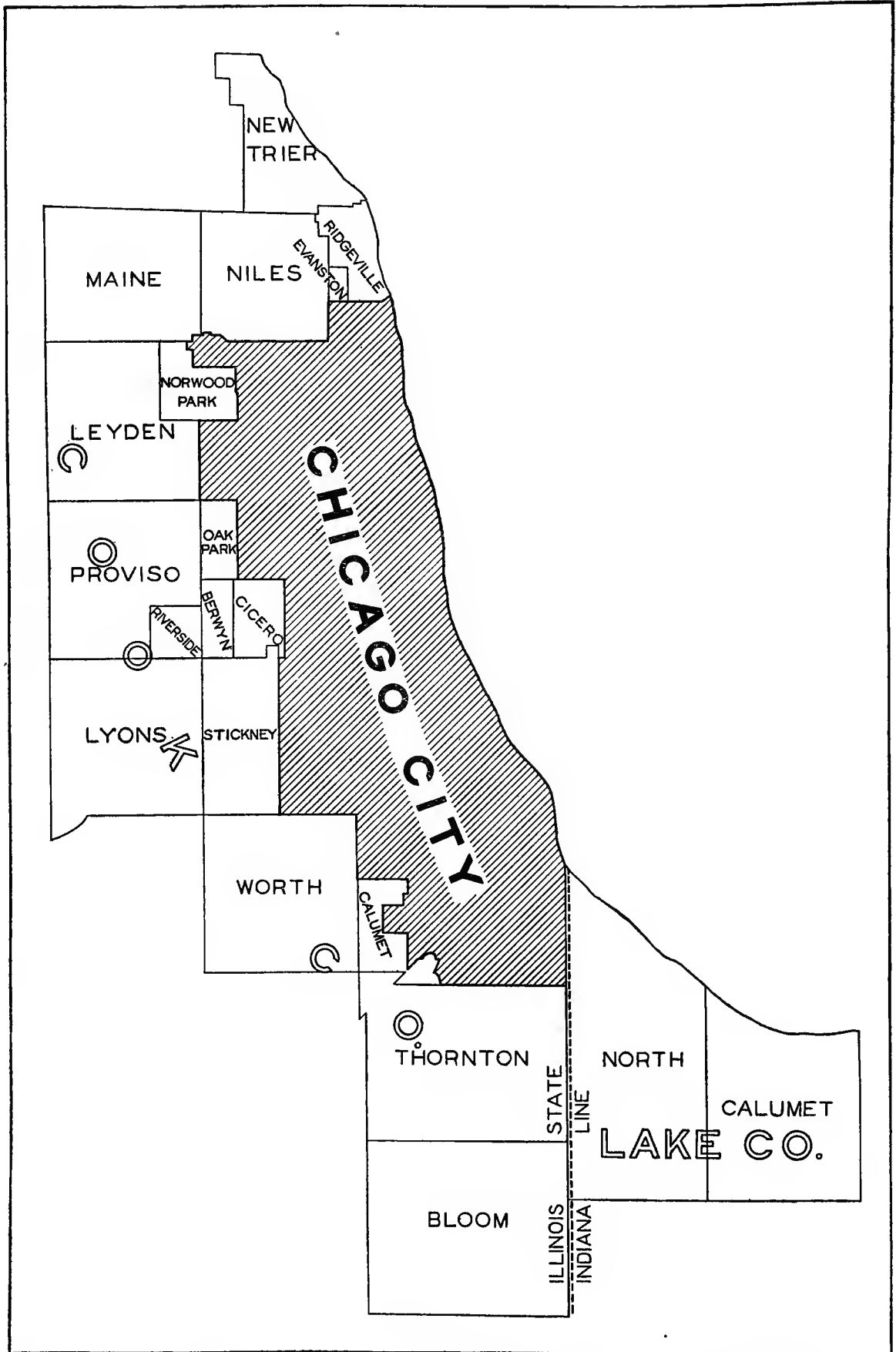
Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and had a value of products amounting to \$10,000,000 or more in 1909 are given in Table 8 (p. 913) for the district as constituted in 1909, 1904, and 1899, respectively.

The greatest absolute increase in value of products shown for any single industry during the decade, amounting to \$165,984,908, or 158.6 per cent, was that for the women's clothing industry. The greatest relative increase for any of the industries included in the table, 673.4 per cent, was reported for smelting and refining from clippings, sweepings, and scrap.

An important industry not given in the comparative table is the manufacture of men's furnishing goods. At the censuses of 1904 and 1899 some of the establishments reporting as chief products suspenders, garters, and elastic woven goods were excluded from this industry. As it is not practicable to segregate these establishments, no proper comparison is possible.

MANUFACTURES.

CHICAGO METROPOLITAN DISTRICT: 1909.



CHICAGO METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Chicago embraces 409,087 acres of territory, of which 118,433 acres constitute the area of Chicago and 290,654 acres the area of the outside territory. The population of the city of Chicago proper in 1910 was 2,185,283, and that of the outside territory 261,638, the total for the district being 2,446,921.

As defined at the census of 1910, the metropolitan district includes the central city, together with Berwyn, Bloom, Calumet, Cicero, Evanston, Leyden, Lyons, Maine, New Trier, Niles, Norwood Park, Oak Park, Proviso, Ridgeville, Riverside, Stickney, Thornton, and Worth townships, all in Cook County, Ill., and Calumet and North townships in Lake County, Ind. Within these townships, or coextensive with them, there are seven incorporated places of 10,000 or more inhabitants. Of these four are in Illinois, namely, Chicago Heights city, in Bloom township; Cicero town, coextensive with Cicero township; Evanston city, coextensive with Ridgeville township; and Oak Park village, coextensive with Oak Park township. The remaining three, which are in Indiana, are East Chicago city and Hammond city, both in North township; and Gary city in Calumet township.

The territory comprised within the Chicago industrial district as constituted for the bulletin on industrial districts for 1904 did not include Bloom township, which contains Chicago Heights city, or Maine township, or the townships and incorporated places in Indiana; but it comprised, in addition to the territory represented by the other places mentioned above, Downers Grove and York townships in Dupage County, Ill., and Palos township in Cook County, Ill.

The relative location of the constituent divisions is indicated on the outline map of the district (p. 914).

Summary for the district.—Table 9 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the Chicago metropolitan district, for the city of Chicago; for six of the seven other incorporated places within the district which had over 10,000 inhabitants in 1910—four cities, one town, and one village—and for the remainder of the district. The percentage which the figure for Chicago represents of the total for the district is shown in the case of each item. The statistics for Gary, Ind., are included in the "remainder" of the district to avoid disclosing the operations of individual establishments.

	NUMBER OR AMOUNT.										Per cent Chicago is of total for district.
	The district.	Chicago.	District exclusive of Chicago.							Remainder. ¹	
			Total.	Chicago Heights.	Cicero.	East Chicago.	Evans-ton.	Hammond.	Oak Park.		
Population ²	2,446,921	2,185,283	261,638	14,525	14,557	19,098	24,978	20,925	19,444	148,111	89.3
Number of establishments.....	10,202	9,656	546	79	7	16	60	49	23	312	94.6
Persons engaged in manufactures.....	393,859	356,954	36,905	4,444	735	2,568	1,040	4,379	362	23,377	90.6
Proprietors and firm members.....	8,600	8,156	444	60	2	6	63	33	21	259	94.8
Salaried employees.....	59,335	54,821	4,514	431	75	192	140	505	59	3,112	92.4
Wage earners (average number).....	325,924	293,977	31,947	3,953	658	2,370	837	3,841	282	20,006	90.2
Primary horsepower.....	739,229	525,236	213,993	10,176	1,580	7,017	1,056	7,348	758	186,058	71.1
Capital.....	\$1,144,002,902	\$971,840,545	\$172,162,357	\$10,420,527	\$2,496,100	\$4,614,380	\$4,241,198	\$16,270,855	\$6,060,795	\$128,058,502	85.0
Expenses.....	1,272,456,182	1,156,830,537	115,625,645	9,475,197	1,403,638	4,873,173	3,329,854	14,894,019	734,654	81,215,110	90.9
Services.....	266,626,915	240,036,910	26,590,005	3,076,709	503,248	1,532,365	767,307	2,474,618	253,611	17,981,947	90.0
Salaries.....	71,160,747	65,924,841	5,235,906	605,622	97,094	247,277	177,750	614,185	57,009	3,436,969	92.6
Wages.....	195,466,168	174,112,069	21,354,099	2,471,087	406,154	1,285,088	589,557	1,860,633	196,602	14,544,978	89.1
Materials.....	870,586,561	793,469,723	77,116,838	5,611,419	732,879	3,059,915	2,350,080	6,651,355	390,887	58,320,303	91.1
Miscellaneous.....	135,242,706	123,023,904	12,218,802	787,069	167,511	280,893	212,467	5,767,846	90,156	4,912,860	91.0
Value of products.....	1,408,779,818	1,281,171,181	127,608,637	10,839,268	1,461,164	5,483,500	3,778,298	15,580,250	1,117,697	89,348,460	90.9
Value added by manufacture.....	538,193,257	487,701,458	50,491,799	5,227,849	728,285	2,423,585	1,428,218	8,928,895	726,810	31,028,157	90.6

¹ Includes Gary, Ind., the statistics for which can not be shown without disclosing individual operations.

² April 15, 1910.

In 1909 the Chicago metropolitan district had 10,202 manufacturing establishments, which gave employment to an average of 393,859 persons during the year and paid out \$266,626,915 in salaries and wages. Of the persons employed 325,924 were wage earners. These establishments turned out products to the value of \$1,408,779,818, to produce which materials costing \$870,586,561 were utilized. The value added by manufacture was thus \$538,193,257. The Chicago

district ranked second in 1909 among all the metropolitan districts of the United States in the value of its manufactured products. It far exceeded any of them in the value of products of the slaughtering and meat-packing industry.

In the Chicago district, as in all but two of the districts, the greater part of the value of the manufactured products of the district was reported by factories within the central city. Chicago contained nearly

nine-tenths (89.3 per cent) of the population of the district, of which it is the manufacturing, commercial, and financial center, and contributed over nine-tenths (90.9 per cent) of the value of products. Its manufacturing establishments constituted 94.6 per cent of all in the district, and gave employment to 90.2 per cent of the average number of wage earners for that area.

Of the places outside Chicago for which statistics are given separately, Hammond reported the largest value of products, but this value represented only 1.1 per cent of the total for the metropolitan district. The population of this city formed only nine-tenths of 1 per cent of the total in the district.

The area comprised within the 17 townships, or parts of townships, outside of incorporated places having more than 10,000 inhabitants, included in the district, together with Gary city, for which statistics can not be shown separately without disclosing the operations of individual establishments, had a combined population equal to 6.1 per cent of the total for the district and contributed 6.3 per cent of the value of its products. The average value of products per establishment for this group was much greater than that for any of the places shown separately, except East Chicago and Hammond.

The leading industries in Chicago Heights in 1909 were foundries and machine shops, steel works and rolling mills, and steam-railroad car construction shops. The principal industry of Evanston was the

manufacture of wrought iron and steel pipe. In Cicero foundries and machine shops and the manufacture of wrought iron and steel pipe constituted the most important industries. The production of illuminating gas occupied first place in Oak Park. In Gary, Ind., three establishments—a steel plant, a blast furnace, and a cement factory, named in the order of their importance—together contributed nearly the total value of the manufactured products of the city. The principal industries of Hammond were distilleries, steam-railroad repair shops, and foundries and machine shops. The manufacture of iron and steel was the leading industry in East Chicago. An important industrial place for which the statistics are not shown separately is Indiana Harbor, Ind., with large steel works and rolling mills.

Comparison with earlier censuses.—Table 10 gives statistics for the district for 1909, 1904, and 1899. For purposes of comparison the statistics in this table are grouped in such a way as to show separately for 1909 figures for (1) the territory added to the district since 1904 (Bloom and Main townships in Illinois and Calumet and North townships in Indiana) and (2) the remainder of the district; and for 1904 and 1899 figures for (1) the territory deducted since 1904 (Downers Grove, York, and Palos townships in Illinois) and (2) the remainder of the district. Percentages of increase are shown only for the territory which was included in the district in both 1909 and 1904.

Table 10

	NUMBER OR AMOUNT.									PER CENT OF INCREASE.		
	1909			1904			1899			1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹			
Population.....	2,446,921	91,875	2,355,046	(³)	(⁵)	(⁵)	1,815,107	11,829	1,803,278	30.6	.....	.....
Number of establishments.....	10,202	242	9,960	8,332	27	8,355	7,851	25	7,826	27.3	19.2	6.8
Persons engaged in manufactures.....	393,859	23,913	369,946	296,350	161	296,189	(⁵)	(⁵)	(⁵)	.....	24.9	.....
Proprietors and firm members.....	8,600	183	8,417	7,481	27	7,454	(⁵)	(⁵)	(⁵)	.....	12.9	.....
Salaried employees.....	59,335	2,550	56,785	40,880	19	40,861	32,806	18	32,788	73.2	39.0	24.6
Wage earners (average number).....	325,924	21,180	304,744	247,939	115	247,824	224,991	99	224,892	35.5	22.9	10.2
Primary horsepower.....	739,229	188,321	550,908	379,566	262	379,304	(⁵)	(⁵)	(⁵)	.....	45.2	.....
Capital.....	\$1,144,002,902	\$117,915,318	\$1,026,087,584	\$664,215,775	\$120,088	\$664,095,687	\$519,469,858	\$146,329	\$519,323,529	97.6	54.5	27.9
Expenses.....	1,272,456,182	89,686,671	1,182,769,511	882,469,100	229,456	882,239,644	720,597,395	226,440	720,370,955	64.2	34.1	22.5
Services.....	266,626,915	17,004,035	249,622,880	186,165,672	64,009	186,101,663	143,083,714	70,732	143,012,982	74.5	34.1	30.1
Salaries.....	71,160,747	3,172,816	67,987,931	46,336,318	12,582	46,323,736	32,501,114	17,250	32,483,864	109.3	46.8	42.6
Wages.....	195,466,168	13,831,219	181,634,949	139,829,354	51,427	139,777,927	110,582,600	53,482	110,529,118	64.3	29.9	26.5
Materials.....	870,586,561	62,738,865	807,847,696	598,556,727	130,346	598,426,381	506,673,549	137,655	506,535,894	59.5	35.0	18.1
Miscellaneous.....	135,242,706	9,943,771	125,298,935	97,746,701	35,101	97,711,600	70,840,132	18,053	70,822,079	76.9	28.2	38.0
Value of products.....	1,408,779,818	99,028,732	1,309,751,086	970,974,280	272,730	970,701,550	806,464,641	288,520	806,176,121	62.5	34.9	20.4
Value added by manufacture.....	538,193,257	36,289,867	501,903,390	372,417,553	142,384	372,275,169	299,791,092	150,865	299,640,227	67.5	34.8	24.2

¹ Figures in this column used in computing percentages of increase. ² April 15, 1910. ³ No population census in 1905. ⁴ June 1, 1900. ⁵ Figures not available.

In the area for which comparisons are made the percentages of increase in all the items shown, except one, for the three census years were larger during the more recent five-year period 1904-1909 than during the period 1899-1904. During the decade as a whole the rate of increase was much greater in salaries and capital than in any other items. The average number of

wage earners increased 35.5 per cent during this period and the amount paid for wages 64.3 per cent, a rate of gain approximately equal to that in value of products (62.5 per cent). The rate of increase in primary horsepower of all kinds from 1904 to 1909 was 45.2 per cent. Statistics as to the primary power used in 1899 are not available.

The proportions of the population and manufactures in the outside territory of the metropolitan district are constantly increasing, as is indicated by Table 11.

Table 11

	PER CENT TERRITORY OUTSIDE OF CHICAGO IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904 ²	1899 ²
Population.....	7.2	(*)	5.8
Number of establishments.....	3.1	2.3	2.0
Persons engaged in manufactures.....	3.5	2.2	(*)
Proprietors and firm members.....	3.1	2.5	(*)
Salaried employees.....	3.5	1.4	1.2
Wage earners (average number).....	3.5	2.4	1.6
Primary horsepower.....	4.7	2.6	(*)
Capital.....	5.3	4.0	1.5
Expenses.....	2.2	1.6	1.0
Services.....	3.8	2.2	1.6
Salaries.....	3.0	1.6	1.3
Wages.....	4.1	2.4	1.6
Materials.....	1.8	1.4	0.9
Miscellaneous.....	1.8	1.4	0.5
Value of products.....	2.2	1.6	1.0
Value added by manufacture.....	2.8	1.9	1.3

¹ Based on figures for district as constituted in 1909, exclusive of territory added since 1904.

² Based on figures for district as constituted in 1904, exclusive of territory deducted since 1904.

³ No population census in 1905.

⁴ Figures not available.

The proportion which the population outside Chicago, but within the area comprised in the district, in each census year formed of the total in that area increased from 5.8 per cent in 1900 to 7.2 per cent in 1910, and the proportion of the value of products of that area that was contributed by the outlying territory increased from 1 per cent in 1899 to 1.6 per cent in 1904, and to 2.2 per cent in 1909.

Leading industries.—Table 12 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

Among the industries shown separately in the table there are 23 for which totals for the district can not be published, because to do so would disclose individual operations; and 26 which were not carried on in the part of the district which is outside the corporate limits of Chicago. In all these cases the statistics shown are figures for Chicago exclusively.

The predominant industry of the Chicago metropolitan district is slaughtering and meat packing. The figures shown for this industry are for Chicago exclusively, one small establishment in 1909 engaged in the manufacture of sausage in the territory outside Chicago being excluded to avoid disclosing the operations of individual concerns. The 67 establishments in Chicago in 1909 reported products valued at \$325,061,657, or 23.1 per cent of the value of products of all industries in the district. Other important industries were foundries and machine shops, with a value of products amounting to \$104,319,563; the making of men's clothing, including shirts, with products valued at \$85,296,407; printing and publishing, with products valued at \$76,070,564; and steel works and rolling mills, with products valued at \$71,531,974.

The value of products shown for establishments engaged in the manufacture of electrical machinery, apparatus, and supplies, and of copper, tin, and sheet-iron products is much less than the actual figures for these industries in the district, statistics for the establishments outside of Chicago having been omitted in order to avoid disclosing the operations of individual concerns.

SUMMARY FOR THE CHICAGO METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All industries.....	10,202	333,859	8,600	59,335	326,924	739,229	\$1,144,002,902	\$71,160,747	\$195,466,168	\$870,586,561	\$135,242,706	\$1,408,779,818	\$638,193,257
Automobiles, including bodies and parts.....	141	1,725	17	248	1,460	734	2,094,348	304,511	1,131,443	1,706,765	522,345	3,939,735	2,232,970
Awnings, tents, and sails.....	33	350	34	34	282	158	275,380	26,144	139,065	569,207	62,783	915,403	346,256
Bags, other than paper.....	6	213	4	20	189	157	575,574	24,160	175,042	685,033	11,383	965,442	280,409
Baking powders and yeast.....	16	940	8	410	522	1,142	5,873,320	447,128	303,834	2,883,242	1,782,747	7,008,662	4,120,420
Belting and hose, leather.....	11	403	9	181	233	430	1,279,476	183,085	164,536	1,384,568	319,423	2,187,555	802,937
Boots and shoes, including cut stock and findings.....	31	3,326	29	270	3,027	1,103	3,880,595	324,805	1,919,794	6,044,689	494,674	9,356,302	3,810,613
Boxes, cigar.....	9	348	9	35	304	214	292,197	45,657	124,864	255,094	48,436	540,774	232,680
Boxes, fancy and paper.....	48	3,984	22	353	3,609	1,575	3,118,225	399,684	1,311,235	2,231,889	481,060	5,043,621	2,811,732
Brass and bronze products.....	156	1,430	38	225	1,167	1,099	2,491,807	303,717	810,203	3,265,574	306,699	6,131,391	1,865,817
Bread and other bakery products.....	1,278	9,257	1,351	1,183	6,723	3,899	20,988,156	1,160,173	4,373,201	16,983,122	2,057,451	28,146,786	11,163,664
Brick and tile.....	19	2,115	9	117	1,989	12,202	7,860,399	167,403	1,890,691	930,874	206,513	3,788,295	2,851,421
Brooms.....	128	282	34	26	222	169	249,943	25,136	118,294	402,350	30,790	680,003	277,647
Brushes.....	28	334	26	33	275	94	440,034	40,696	163,064	515,774	75,283	879,548	363,774
Canning and preserving.....	52	1,416	50	139	1,177	1,470	2,646,101	239,014	525,217	3,413,469	332,815	5,005,292	1,691,833
Carriages and wagons and materials.....	144	2,473	167	176	2,140	3,441	7,971,855	216,506	1,365,663	2,880,153	350,652	5,685,809	2,805,656
Cars and general shop construction and repairs by steam-railroad companies.....	28	12,598	.....	596	12,002	9,995	10,703,708	639,835	7,962,234	7,639,305	210,540	16,451,913	8,812,608
Cars and general shop construction and repairs by street-railroad companies.....	17	1,721	.....	57	1,664	1,584	3,061,331	64,086	1,068,627	1,519,690	94,675	2,758,388	1,238,698
Cars, steam-railroad, not including operations of railroad companies.....	24	11,857	2	907	10,948	13,556	39,641,537	1,025,728	7,577,576	14,752,493	1,388,183	25,462,246	10,709,753
Chemicals.....	14	863	2	164	697	2,245	2,496,331	231,119	467,658	1,316,406	329,070	3,250,423	1,934,017
Clothing, men's, including shirts.....	1,678	38,370	830	3,925	33,615	2,916	36,521,124	4,291,780	15,776,654	42,768,038	13,782,710	85,296,407	42,628,369

¹ Excluding statistics for establishments located outside of the corporate limits of Chicago, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and had a value of products amounting to \$5,000,000 or more in 1909 are given in Table 13 for 1909, 1904, and 1899, respectively.

COMPARATIVE SUMMARY FOR THE CHICAGO METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES: 1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
	1909	1904	1899	1909	1904	1899	1909	1904	1899	Number of establishments.			Wage earners (average number).			Value of products.		
										1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Slaughtering and meat packing.....	* 67	56	51	22,064	22,767	25,474	\$325,061,657	\$270,548,962	\$257,270,151	31.4	19.6	9.8	-13.4	-3.1	-10.6	26.4	20.1	5.2
Slaughtering and meat packing, wholesale.....	29	24	28	21,494	22,391	25,141	317,585,257	262,586,609	248,811,937	3.6	20.8	-14.3	-14.5	-4.0	-10.9	27.6	20.9	5.5
Slaughtering, wholesale, not including meat packing.....	12	8	10	225	222	204	4,367,571	6,994,877	7,715,952	20.0	50.0	-20.0	10.3	1.4	8.8	-43.4	-37.6	-9.3
Sausage.....	* 26	24	13	345	154	129	3,108,829	967,476		100.0	8.3	84.6	167.4	124.0	19.4	318.9	221.3	30.4
Foundry and machine-shop products.....	721	599	(*)	35,331	30,002	(*)	104,319,563	71,243,847	(*)		20.4			17.8			46.4	
Clothing.....	882	767	1,056	39,230	23,963	19,007	100,973,332	66,262,793	47,055,123	-16.5	15.0	-27.4	106.4	63.7	26.1	114.6	62.4	40.8
Men's, including shirts.....	* 678	* 593	* 905	33,615	19,655	15,019	85,296,407	54,625,975	37,846,669	-25.1	14.3	-34.5	123.8	71.0	30.9	125.4	56.1	44.3
Women's.....	* 204	174	151	5,615	4,308	3,988	15,676,925	11,636,818	9,208,454	35.1	17.2	15.2	40.8	30.3	8.0	70.2	34.7	26.4
Printing and publishing.....	1,466	1,308	1,123	23,625	17,594	15,531	76,070,564	53,472,267	36,417,539	30.5	12.1	16.5	52.1	34.3	13.3	108.9	42.3	46.8
Book and job.....	823	706	606	15,857	11,518	9,552	37,405,284	26,243,822	18,587,539	35.8	16.6	16.5	66.0	37.7	20.6	101.2	44.5	41.2
Newspapers and periodicals.....	485	459	371	4,119	3,481	3,814	30,901,282	21,991,468	14,122,484	30.7	5.7	23.7	8.0	18.3	-8.7	118.8	40.5	55.7
Music.....	24	32	22	62	40	53	946,517	579,417	282,297	9.1	-25.0	45.5				235.3	63.4	105.2
All other printing and publishing industries.....	134	111	124	3,587	2,555	2,112	6,817,481	4,657,560	3,425,219	8.1	20.7	-10.5	69.8	40.4	21.0	99.0	46.4	36.0
Iron and steel, steel works and rolling mills.....	16	* 5	(*)	15,245	5,087	(*)	71,531,974	24,839,623	(*)		220.0			199.7			188.0	
Lumber and timber products.....	213	164	135	10,653	8,060	5,866	33,569,593	20,336,622	12,065,292	57.8	29.9	21.5	81.6	32.2	37.4	178.2	65.1	68.6
Bread and other bakery products.....	1,278	880	725	6,723	5,922	4,478	28,146,786	21,061,370	12,905,586	76.3	45.2	21.4	50.1	13.5	32.2	118.1	33.6	63.2
Cars, steam-railroad, not including operations of railroad companies.....	24	11	13	10,948	7,059	7,589	25,462,246	23,798,900	19,108,085	84.6	118.2	-15.4	44.3	55.1	-7.0	33.3	7.0	24.5
Electrical machinery, apparatus, and supplies.....	* 123	96	71	6,096	5,927	5,787	20,668,505	16,291,546	11,357,986	73.2	28.1	35.2	5.3	2.9	2.4	82.0	26.9	43.4
Furniture and refrigerators.....	208	160	120	9,957	9,754	7,975	20,638,171	17,722,381	12,539,210	73.3	30.0	33.3	24.9	2.1	22.3	64.6	16.5	41.3
Soap.....	27	23	27	2,139	1,835	1,484	19,939,041	13,769,946	9,064,989		17.4	-14.8	44.1	16.6	23.7	120.0	44.8	51.9
Liquors, malt.....	48	* 56	37	2,905	2,763	2,272	19,712,962	16,983,421	14,956,865	29.7	-14.3	51.4	27.9	5.1	21.6	31.8	18.1	13.5
Coffee and spice, roasting and grinding.....	32	23	25	1,006	940	922	19,593,188	15,563,301	12,612,424	28.0	39.1	-8.0	9.1	7.0	2.0	55.3	25.9	23.4
Paint and varnish.....	* 61	52	46	1,606	1,195	866	18,942,448	12,664,948	8,096,007	32.6	17.3	13.0	85.4	34.4	38.0	134.0	49.6	56.4
Tobacco manufactures.....	1,102	993	846	5,343	4,401	3,516	16,919,417	11,124,658	8,235,267	30.3	11.0	17.4	52.0	21.4	25.2	105.4	52.1	35.1
Cigars and cigarettes.....	1,070	969	822	4,284	3,651	2,885	8,862,067	6,894,925	5,180,727	30.2	10.4	17.9	48.6	17.3	26.6	71.1	28.5	33.1
Chewing and smoking tobacco and snuff.....	32	24	24	1,059	750	631	8,057,350	4,229,733	3,084,540	33.3	33.3		67.8	41.2	18.9	163.8	90.5	38.5
Cars and general shop construction and repairs by steam-railroad companies.....	28	* 22	24	12,002	8,592	6,787	16,451,913	11,171,554	8,185,431	16.7	27.3	-8.3	76.8	39.7	26.6	101.0	47.3	36.5
Musical instruments.....	69	56	57	6,857	5,370	4,532	15,169,760	9,151,010	7,403,628	21.1	23.2	-1.8	51.3	27.7	18.5	104.9	65.8	23.6
Pianos and organs and materials.....	42	32	31	6,525	4,886	4,107	14,555,453	8,487,726	6,896,355	35.5	31.2	3.2	58.9	33.5	19.0	111.1	71.6	23.1
Instruments and materials not specified.....	27	* 24	26	332	484	425	614,307	663,284	507,293	3.8	12.5	-7.7	-21.9	-31.4	13.9	21.1	-7.4	30.7
Leather, tanned, curried, and finished.....	24	23	22	2,674	2,479	2,047	13,243,550	9,420,426	6,979,289	9.1	4.3	4.5	30.6	7.9	21.1	89.8	40.6	35.0
Copper, tin, and sheet-iron products.....	* 268	174	162	3,859	4,391	3,669	12,241,950	11,903,852	8,437,495	65.4	54.0	7.4	5.2	-12.1	19.7	45.1	2.8	41.1
Confectionery.....	91	63	52	3,245	2,965	2,600	11,241,011	6,592,183	5,757,334	75.0	46.4	21.2	24.8	9.4	14.0	95.2	70.5	14.5
Patent medicines and compounds and druggists' preparations.....	277	* 248	* 204	1,363	1,564	1,129	10,376,264	11,942,051	9,921,497	35.8	11.7	21.6	20.7	-12.9	38.5	75.2	-13.1	101.7
Boots and shoes, including cut stock and findings.....	31	* 35	* 45	3,027	2,446	2,992	9,855,302	6,559,350	6,813,763	-31.1	-11.4	-22.2	1.2	23.8	-18.2	44.6	50.2	-3.7
Baking powders and yeast.....	16	16	14	522	645	442	7,008,662	3,890,258	3,335,827	14.3		14.3	18.1	-19.1	45.9	110.1	80.2	16.6
Leather goods.....	103	85	* 72	2,217	2,041	2,023	6,074,015	5,044,884	3,857,944	43.1	21.2	18.1	4.6	8.6	0.9	57.4	20.4	30.8
Food preparations.....	78	* 47	49	802	608	563	6,017,603	3,228,835	3,066,960	59.2	66.0	-4.1	42.5	31.9	8.0	96.2	86.4	5.3
Carriages and wagons, and materials.....	144	130	104	2,140	1,864	1,592	5,685,809	4,137,325	3,075,016	38.5	10.8	25.0	34.4	14.8	17.1	84.9	37.4	34.5
Brass and bronze products.....	* 56	46	44	1,167	974	788	5,131,391	3,500,077	2,703,042	27.3	21.7	4.5	48.1	19.8	23.6	89.8	46.6	29.5
Boxes, fancy and paper.....	48	39	38	3,609	2,324	2,381	5,043,621	2,825,271	2,923,299	26.3	21.1	2.6	51.6	55.3	-2.4	72.5	78.5	-3.4
Canning and preserving.....	52	53	* 49	1,177	1,031	914	5,005,232	4,007,637	3,544,610	6.1	-1.9	8.2	14.2	12.8	41.2	24.9	13.1	

¹ A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners.
² Excluding statistics for one establishment, to avoid disclosure of individual operations.
³ Comparable figures not available.
⁴ Includes "bookbinding and blank-book making;" "engraving, steel and copper plate, including plate printing;" and "lithographing."
⁵ Excluding statistics for five establishments, to avoid disclosure of individual operations.
⁶ Excluding statistics for two establishments, to avoid disclosure of individual operations.
⁷ Excluding statistics for twenty-two establishments, to avoid disclosure of individual operations.

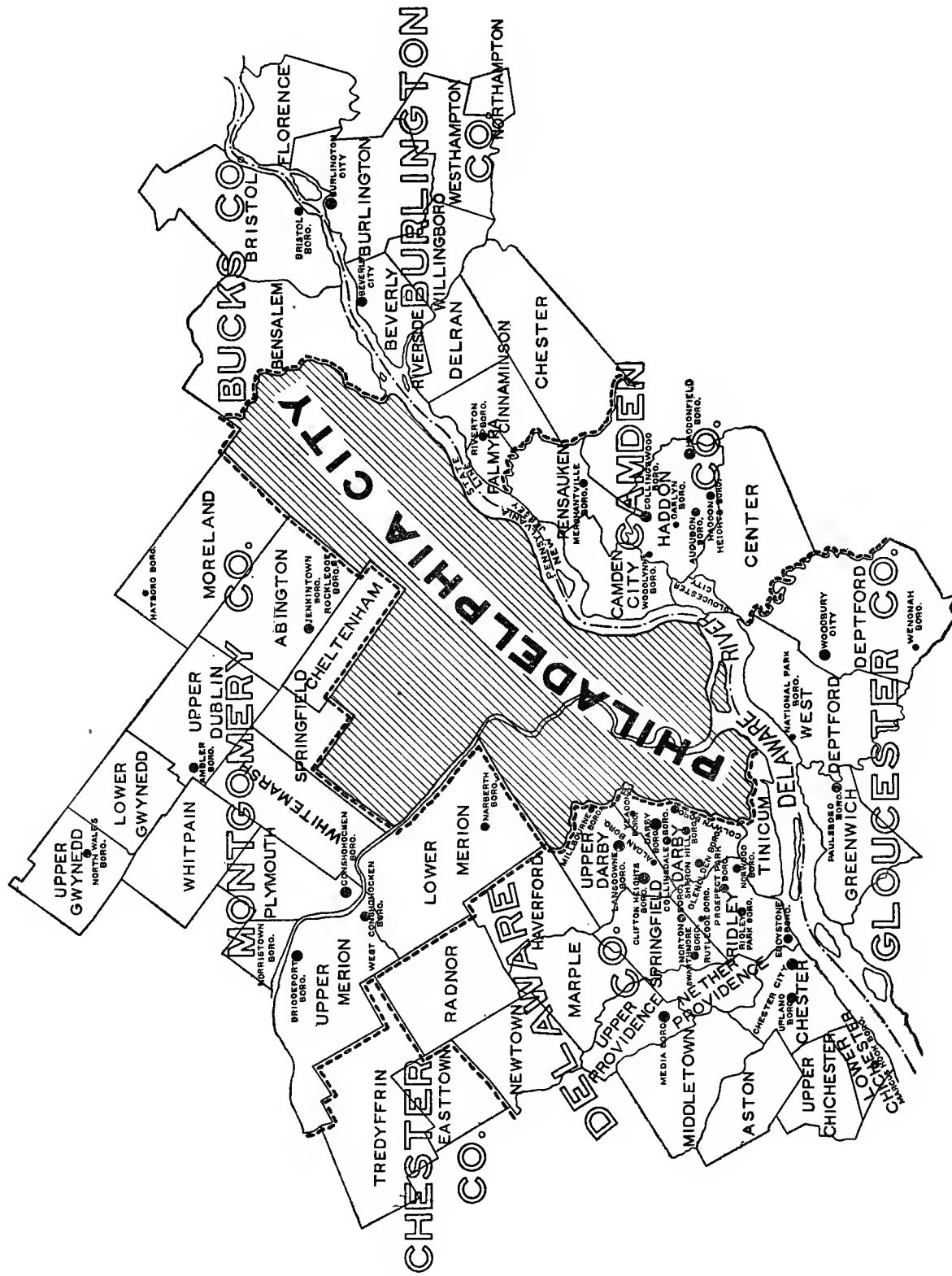
The greatest absolute increase during the decade in value of products shown for any individual industry included in the table was for slaughtering and meat packing—\$67,791,506, or 26.4 per cent; the greatest relative increase for any single industry (178.2 per cent) was reported for the lumber industry.

The blast-furnace industry, the manufacture of agricultural implements, the smelting and refining of lead, the gas industry, the refining of petroleum, and the manufacture of cordage and twine and jute and linen goods, of flour and grist mill products, of distilled liquors,

of oleomargarine, of cement, and of glucose and starch are among the important industries in the district that can not be shown separately, as to do so would disclose individual operations. They are mentioned in the order of their importance.

The inclusion, in this comparative table, of the 1909 statistics for industries in the territory added since 1904 raises very much the total value of products of steel—"iron and steel, steel works and rolling mills," and of musical instruments, pianos and organs and materials.

PHILADELPHIA METROPOLITAN DISTRICT: 1909.



PHILADELPHIA METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Philadelphia embraces 437,733 acres of territory, of which 83,340 acres represent the area of Philadelphia, and 354,393 acres the area of the outside territory. The population of the city of Philadelphia proper in 1910 was 1,549,008, and that of the outside territory 423,334, the total for the district being 1,972,342.

As defined at the Thirteenth Census, the metropolitan district comprised, in addition to the city of Philadelphia, 6 cities, 42 boroughs, and 49 townships—a total of 97 civil divisions. Five of the cities, 11 of the boroughs, and 17 of the townships are situated in New Jersey. The district covered by the statistics published in the bulletin on industrial districts for 1904 contained, besides Philadelphia, 68 civil divisions, all but 8 of which are among the number included for 1909. These 8 divisions comprise Southampton township in Bucks County, Pa.; Thornbury and Willistown townships in Chester County, Pa.; and Bethel, Birmingham, Concord, Edgemont, and Thornbury townships in Delaware County, Pa.

The various cities, boroughs, and townships included in the metropolitan district in 1909 are shown below, by counties. Places included in the district in 1904 are indicated by (*):

PENNSYLVANIA.

PHILADELPHIA COUNTY.

*Philadelphia city.

BUCKS COUNTY.

*Bensalem township.	Bristol township.
Bristol borough.	

CHESTER COUNTY.

*Easttown township.	Tredyffrin township.
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DELAWARE COUNTY.

*Aldan borough. *Aston township. *Chester city. *Chester township. *Clifton Heights borough. *Collingdale borough. *Colwyn borough. *Darby borough. *Darby township. *Eddystone borough. *Glenolden borough. *Haverford township. *Lansdowne borough. *Lower Chichester township. *Marcus Hook borough. *Marple township. *Media borough. *Middletown township. *Millbourne borough.	*Morton borough. *Nether Providence township. *Newtown township. *Norwood borough. *Prospect Park borough. *Radnor township. *Ridley township. *Ridley Park borough. *Rutledge borough. *Sharon Hill borough. *Springfield township. *Swarthmore borough. *Tinicum township. *Upland borough. *Upper Chichester township. *Upper Darby township. *Upper Providence township. *Yeadon borough.
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PENNSYLVANIA—Continued.

MONTGOMERY COUNTY.

*Abington township. Ambler borough. Bridgeport borough. *Cheltenham township. *Conshohocken borough. *Hatboro borough. *Jenkintown borough. Lower Gwynedd township. *Lower Merion township. *Moreland township. *Narberth borough.	Norristown borough. North Wales borough. *Plymouth township. *Rockledge borough. *Springfield township. Upper Dublin township. Upper Gwynedd township. Upper Merion township. *West Conshohocken borough. *Whitmarsh township. Whitpain township.
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NEW JERSEY.

BURLINGTON COUNTY.

Beverly city. Beverly township. Burlington city. Burlington township. Chester township. Cinnaminson township. Delran township.	Florence township. Northampton township. Palmyra township. Riverside township. Riverton borough. Westhampton township. Willingboro township.
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CAMDEN COUNTY.

*Audubon borough. *Camden city. *Center township. *Collingswood borough. *Gloucester city. *Haddon township.	*Haddon Heights borough. *Haddonfield borough. *Merchantville borough. *Oaklyn borough. *Pensauken township. *Woodlynne borough.
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GLOUCESTER COUNTY.

Deptford township. Greenwich township. National Park borough. Paulsboro borough.	Wenonah borough. West Deptford township. Woodbury city.
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On page 920 is an outline map of the metropolitan district as constituted in 1909, showing the various cities, boroughs, and townships included.

Summary for the district.—Table 14 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the Philadelphia district; for the cities of Philadelphia, Pa., Camden, N. J., and Chester, Pa., and the borough of Norristown, Pa.; and for the remainder of the district. The percentage which the figure for Philadelphia represents of the total for the district is shown in the case of each item.

In 1909 the Philadelphia metropolitan district had 9,568 manufacturing establishments, which gave employment to an average of 358,218 persons during the year, and paid out \$200,933,659 in salaries and wages. Of the persons employed, 308,947 were wage earners. These establishments turned out products to the value

of \$911,014,010, to produce which materials costing \$529,992,413 were utilized. The value added by manufacture was thus \$381,021,597. The Philadel-

phia district ranked third in 1909 among all the metropolitan districts of the United States in the value of its manufactured products.

Table 14

	NUMBER OR AMOUNT.							Per cent Philadelphia is of total for district.
	The district.	Philadelphia.	District exclusive of Philadelphia.					
			Total.	Camden.	Chester.	Norristown.	Remainder.	
Population ¹	1,972,342	1,549,008	423,334	94,538	38,537	27,875	262,384	78.6
Number of establishments.....	9,568	8,379	1,189	365	128	111	585	87.6
Persons engaged in manufactures.....	358,218	294,498	63,720	18,709	7,867	4,223	32,921	82.2
Proprietors and firm members.....	10,263	9,162	1,101	315	102	104	580	89.3
Salaried employees.....	39,008	33,452	5,556	1,867	779	301	2,609	85.8
Wage earners (average number).....	308,947	251,884	57,063	16,527	6,986	3,818	29,732	81.5
Primary horsepower.....	497,453	365,950	131,503	29,056	17,131	5,713	79,603	73.6
Capital.....	\$863,968,450	\$691,396,873	\$172,571,577	\$49,158,308	\$23,928,262	\$6,983,733	\$92,501,274	80.0
Expenses.....	810,775,271	663,405,035	147,370,236	42,679,240	17,053,434	6,009,126	81,623,436	81.8
Services.....	200,933,659	165,827,013	35,106,646	11,013,136	4,356,504	1,931,134	17,805,872	82.5
Salaries.....	46,619,252	39,446,184	7,173,068	2,406,488	964,501	378,130	3,423,949	84.6
Wages.....	154,314,407	126,380,829	27,933,578	8,606,648	3,392,003	1,553,004	14,381,923	81.9
Materials.....	529,992,413	429,092,277	100,900,136	27,383,800	11,576,388	3,274,199	58,665,749	81.0
Miscellaneous.....	79,849,199	68,485,745	11,363,454	4,282,304	1,120,542	803,793	5,156,815	85.8
Value of products.....	911,014,010	746,075,659	164,938,351	49,137,874	19,373,312	7,413,211	89,013,952	81.9
Value added by manufacture.....	381,021,597	316,983,382	64,038,215	21,754,074	7,796,926	4,139,012	30,348,203	83.2

¹ April 15, 1910.

The greater part of the value of the manufactured products of the district was reported by factories within the central city. Philadelphia contained over three-fourths (78.5 per cent) of the population of the district in 1910, and contributed over four-fifths (81.9 per cent) of the value of manufactured products for 1909. Its manufacturing establishments constituted 87.6 per cent of the total number of such establishments in the district and gave employment to 81.5 per cent of the average number of wage earners for that area.

Of the places outside of Philadelphia for which statistics are given separately, Camden, N. J., had the largest value of manufactured products in 1909, representing 5.4 per cent of the total for the metropolitan district. The population of Camden was 4.8 per cent of the total for the district in 1910.

The group of cities, boroughs, and townships not shown separately, with a combined population equal to 13.3 per cent of the total for the district, contributed 9.7 per cent of the value of products.

The principal industries of Philadelphia in 1909, as measured by value of products, were the woolen and worsted goods industry, printing and publishing, the refining of sugar, foundries and machine shops, the making of women's clothing and of men's clothing, including shirts, and petroleum refining; of Camden, the tanning, currying, and finishing of leather, and shipbuilding; of Chester, the metal-working and textile industries; and of Norristown, the hosiery and knit-goods industry. A large number of other places in the district, statistics for which are not given separately, reported manufactured products ranging from approximately \$1,200,000 to \$10,000,000 in value in 1909. These places included, in Pennsylvania, Eddystone borough, with foundries and machine shops and tex-

tile dyeing and finishing works; Lower Merion township, with steel works and structural iron plants; Bristol borough, with leather and woolen factories; Marcus Hook borough, with petroleum refineries; Conshohocken borough, with steel works; Clifton Heights and Bridgeport boroughs, with woolen factories; Ambler borough, with plants manufacturing steam packing; and Upper Darby township, with flour mills and gristmills. In New Jersey, the places that reported a large value of products included Gloucester city, with factories manufacturing gas and lamp fixtures; Riverside township, with the manufacture of watch cases; and Burlington city and Florence township, with plants manufacturing cast-iron and steel pipe.

Comparison with earlier censuses.—Table 15 gives statistics for the district for 1909, 1904, and 1899, together with the percentages of increase from census to census. For purposes of accurate comparison the statistics for 1909 have been adjusted by segregating the figures for the territory added since 1904; and those for 1904 and 1899 by segregating the figures for the territory deducted since 1904.

The percentage of increase in all items shown except miscellaneous expenses was greater during the later five-year period 1904–1909 than during the period 1899–1904. For the decade 1899–1909 the relative increase was greater in the amount paid for salaries and in the number of salaried employees than for any other items. The average number of wage earners increased 23.2 per cent during this period, but the wages increased 40.3 per cent, a rate of gain somewhat less than that in value of products, 51.3 per cent. The rate of increase in primary horsepower of all kinds from 1904 to 1909 was 27.6 per cent. Statistics as to the primary power used in 1899 are not available.

Table 15

	NUMBER OR AMOUNT.									PER CENT OF INCREASE. ¹		
	1909			1904			1899			1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ²	Total.	Territory deducted since 1904.	Remainder of district. ²	Total.	Territory deducted since 1904.	Remainder of district. ²			
Population.....	1,972,342	117,127	1,855,215	(⁴)	(⁴)	(⁴)	1,537,904	8,256	1,529,738	21.3	.....	.....
Number of establishments.....	9,568	227	9,341	7,780	9	7,771	8,196	6	8,190	14.1	.....	-5.1
Persons engaged in manufactures.....	358,218	11,439	346,779	295,724	137	295,587	(⁵)	(⁵)	(⁵)	.....	17.3	.....
Proprietors and firm members.....	10,263	194	10,069	8,780	12	8,768	(⁵)	(⁵)	(⁵)	.....	14.8	.....
Salaried employees.....	39,008	906	38,102	25,488	10	25,478	19,163	12	19,151	98.9	49.5	33.0
Wage earners (average number).....	308,947	10,339	298,608	261,456	115	261,341	242,551	135	242,416	23.2	14.3	7.8
Primary horsepower.....	497,453	23,864	473,589	372,040	776	371,264	(⁵)	(⁵)	(⁵)	.....	27.6	.....
Capital.....	\$863,968,450	\$31,623,055	\$832,345,395	\$622,081,779	\$425,276	\$621,656,503	\$505,847,424	\$265,979	\$505,581,445	64.6	38.9	23.0
Expenses.....	810,775,271	26,626,193	784,149,078	601,889,762	467,060	601,422,702	502,835,584	201,076	502,634,508	56.0	30.4	19.7
Services.....	200,933,659	5,359,235	195,574,424	151,923,857	74,034	151,849,823	128,089,820	52,022	128,037,807	52.8	28.8	18.6
Salaries.....	46,619,252	1,024,957	45,594,295	28,830,421	18,180	28,812,241	21,105,446	8,778	21,096,668	116.1	58.2	36.6
Wages.....	154,314,407	4,334,278	149,980,129	123,093,436	55,854	123,037,582	106,964,183	43,244	106,920,939	40.3	21.9	15.1
Materials.....	529,992,413	19,351,001	510,641,412	387,566,627	364,723	387,201,904	330,895,698	142,871	330,753,027	54.4	31.9	17.1
Miscellaneous.....	79,849,199	1,915,957	77,933,242	62,399,878	28,303	62,371,575	43,870,257	5,383	43,865,874	77.7	24.9	42.2
Value of products.....	911,014,010	29,286,032	881,727,978	677,781,117	484,604	677,296,513	582,998,753	219,395	582,779,358	51.3	30.2	16.2
Value added by manufacture.....	381,021,597	9,935,031	371,086,566	290,215,090	119,881	290,095,209	252,108,055	76,724	252,026,331	47.2	27.9	15.1

¹ A minus sign (-) denotes decrease. ² Figures in this column used in computing percentages of increase. ³ April 15, 1910. ⁴ No population census of Pennsylvania in 1905. ⁵ June 1, 1900. ⁶ Figures not available.

The proportion of manufactures in the outside territory of the metropolitan district is constantly increasing, as is indicated by Table 16. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904, and those for 1904 and 1899 upon the figures for the district exclusive of the territory subsequently deducted.

tory increased steadily, from 10.8 per cent in 1899 to 12.7 per cent in 1904 and 15.4 per cent in 1909.

Leading industries.—Table 17 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

Among the 101 industries shown separately in the table, there are 17 for which the totals for the district can not be given without disclosing individual operations and 18 which were not carried on in 1909 in the part of the district that is outside the city limits. In the case of all these industries, with the exception of one in the former group, the statistics shown are figures for Philadelphia only.

Of the industries shown separately, the woolen and worsted goods industry ranked highest in value of products in 1909, with 8.4 per cent of the total reported for all industries in the district, followed by foundries and machine shops, with 6.5 per cent of this total, and printing and publishing, with 5.1 per cent. Two industries—the men's clothing and cotton-goods industries—each contributed 3.2 per cent of the total value of products for the district, the making of women's clothing exceeding them slightly, with 3.3 per cent. These small percentages tend to show the great total value of the manufactures, as well as their large variety. The industries in which this, the third greatest metropolitan district, led all other districts in 1909 were the manufacture of carpets and rugs, of fur-felt hats, and of hosiery and knit goods.

Table 16

	PER CENT TERRITORY OUTSIDE OF PHILADELPHIA IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904 ²	1899 ²
Population.....	16.5	(³)	15.6
Number of establishments.....	10.3	8.8	8.4
Persons engaged in manufactures.....	15.1	12.1	(⁴)
Proprietors and firm members.....	9.0	7.2	(⁴)
Salaried employees.....	12.2	10.4	8.6
Wage earners (average number).....	15.6	12.4	11.4
Primary horsepower.....	22.7	21.8	(⁴)
Capital.....	16.9	16.3	11.8
Expenses.....	15.4	13.2	10.7
Services.....	15.2	12.4	11.2
Salaries.....	13.5	11.9	10.3
Wages.....	15.7	12.5	11.4
Materials.....	16.0	13.9	10.8
Miscellaneous.....	12.1	11.1	9.1
Value of products.....	15.4	12.7	10.8
Value added by manufacture.....	14.6	11.1	10.8

¹ Based on figures for district as constituted in 1909, exclusive of territory added since 1904. ² Based on figures for district as constituted in 1904, exclusive of territory deducted since 1904. ³ No population census of Pennsylvania in 1905. ⁴ Figures not available.

The proportion of the population of the district as originally constituted reported for the territory outside of Philadelphia increased from 15.6 per cent in 1900 to 16.5 per cent in 1910, and the proportion of the value of products contributed by the outlying terri-

SUMMARY FOR THE PHILADELPHIA METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employes.	Wage earners (average number).								
All industries.....	9,668	358,218	10,283	39,008	308,947	497,453	\$883,968,450	\$48,618,262	\$154,314,407	\$523,992,413	\$78,849,199	\$911,014,010	\$381,021,597
Artificial flowers and feathers and plumes.....	29	915	35	76	804	70	934,444	71,569	261,863	674,942	111,125	1,313,901	638,959
Automobiles, including bodies and parts.....	22	943	17	93	833	657	1,911,164	130,404	562,271	1,160,387	229,995	2,161,774	1,001,387
Babbitt metal and solder.....	11	212	8	67	137	174	783,315	66,342	79,235	1,466,586	64,402	1,759,625	293,039
Belting and hose, leather.....	113	188	13	56	119	286	636,841	62,616	81,400	809,245	47,634	1,104,086	294,841
Belting and hose, woven and rubber.....	3	393	1	71	321	927	919,940	88,126	147,793	690,754	92,068	1,074,843	384,089
Blackening and cleansing and polishing preparations.....	34	250	33	82	135	238	406,299	82,406	59,664	320,428	90,189	623,597	303,169
Boots and shoes, including cut stock and findings.....	82	5,286	98	394	4,794	1,279	5,173,846	532,616	2,172,641	5,037,440	418,078	8,826,515	3,789,075
Boxes, cigar.....	7	346	9	17	320	362	364,160	26,376	124,521	322,814	28,594	542,983	220,169
Boxes, fancy and paper.....	70	3,852	71	254	3,527	1,488	2,556,384	250,340	1,157,609	1,682,977	341,859	3,963,100	2,280,123
Brass and bronze products.....	64	1,330	43	196	1,091	1,710	3,372,049	264,489	653,801	2,696,556	221,580	4,323,789	1,627,233
Bread and other bakery products.....	1,387	7,810	1,411	1,140	5,259	4,460	16,083,118	965,776	2,976,470	12,866,192	1,317,593	21,105,889	8,239,697
Brick and tile.....	55	1,997	77	80	1,840	4,492	3,847,198	85,652	974,607	576,623	303,678	2,335,712	1,769,089
Brushes.....	137	340	41	40	259	187	517,315	39,302	129,765	385,373	65,178	719,159	333,786
Buttons.....	121	740	23	49	668	393	551,121	68,777	284,600	585,627	54,206	1,158,550	572,923
Canning and preserving.....	123	804	26	150	628	723	1,627,752	165,589	226,086	1,771,581	134,596	2,537,533	765,952
Carpets and rugs, other than rag.....	90	11,546	102	445	10,999	12,165	24,175,744	748,987	4,991,642	14,000,176	2,009,846	23,961,307	9,961,131
Carriages and wagons and materials.....	123	1,955	147	117	1,691	1,352	3,001,171	143,813	1,065,511	1,313,599	215,206	3,357,654	2,044,055
Cars and general shop construction and repairs by steam-railroad companies.....	14	4,478	.....	388	4,090	2,786	5,011,514	280,615	2,849,401	2,892,185	159,812	6,182,014	3,289,829
Chemicals.....	23	2,677	18	326	2,333	5,946	15,620,510	497,463	1,340,705	7,793,494	656,759	11,720,552	3,927,058
Clocks and watches, including cases and materials.....	15	937	3	160	774	793	2,737,282	162,446	399,096	977,648	204,673	1,965,029	987,381
Clothing, horse.....	7	243	5	35	203	141	435,218	47,570	77,296	509,161	51,122	719,946	210,785
Clothing, men's, including shirts.....	461	14,597	723	1,180	12,694	2,647	15,310,716	1,307,794	6,111,911	14,774,702	4,118,327	29,598,311	14,823,609
Clothing, women's.....	355	15,696	581	1,566	13,559	2,010	10,610,964	1,535,681	6,593,164	16,692,952	1,526,447	30,193,475	13,500,523
Coffee and spice, roasting and grinding.....	69	728	85	251	392	1,367	1,915,919	229,106	196,240	3,845,563	232,397	5,033,514	1,187,951
Confectionery.....	149	3,667	157	377	3,133	1,887	4,580,167	463,067	1,080,794	4,675,066	762,640	7,862,383	3,187,317
Cooperage and wooden goods, not elsewhere specified.....	144	814	47	34	733	729	1,500,859	57,066	343,696	1,448,604	98,792	2,213,712	765,108
Copper, tin, and sheet-iron products.....	148	3,615	175	400	3,040	2,129	6,683,076	420,989	1,622,543	4,442,296	478,893	7,726,681	3,284,385
Cordage and twine and jute and linen goods.....	18	1,214	8	43	1,163	2,250	3,816,268	104,517	429,250	2,135,412	75,007	3,324,660	1,189,248
Cotton goods, including cotton small wares.....	161	14,107	149	809	13,149	21,562	27,357,043	1,451,018	5,814,873	16,556,128	2,189,029	29,496,078	12,939,950
Cutlery and tools, not elsewhere specified.....	40	1,355	45	159	1,151	2,659	3,595,982	178,229	682,821	824,793	266,180	2,289,062	1,464,269
Dentists' materials.....	20	812	24	112	676	266	2,218,673	152,776	334,447	1,223,444	167,372	2,148,996	925,552
Dyeing and finishing textiles.....	104	3,991	133	283	3,575	7,037	6,178,763	357,645	1,828,587	2,413,309	524,587	6,327,261	3,913,952
Electrical machinery, apparatus, and supplies.....	49	2,355	27	539	1,789	2,769	6,803,248	573,810	935,023	3,290,886	1,064,541	7,146,485	3,855,599
Fancy articles, not elsewhere specified.....	42	827	47	61	719	341	882,995	52,721	296,278	545,025	128,308	1,281,392	736,367
Fertilizers.....	12	1,068	9	152	907	3,546	4,864,497	237,597	429,166	3,533,270	402,357	4,958,699	1,425,429
Files.....	7	1,298	4	77	1,217	1,313	2,686,218	91,445	527,845	426,845	110,877	1,539,566	1,112,721
Flour-mill and gristmill products.....	63	332	83	44	205	3,352	1,593,178	54,595	120,799	4,348,714	99,037	5,036,925	688,211
Food preparations.....	73	1,663	73	415	1,175	2,141	4,667,923	518,080	667,601	3,578,821	627,357	6,364,404	2,785,583
Foundry and machine-shop products.....	635	29,508	571	3,838	25,099	36,605	79,759,158	4,712,254	14,781,794	29,228,846	4,971,559	59,633,212	30,404,366
Fur goods.....	47	284	59	44	181	10	872,276	31,289	128,529	461,921	97,122	1,031,564	669,643
Furnishing goods, men's.....	39	1,680	50	321	1,309	143	1,528,657	378,590	515,878	2,704,554	215,801	4,282,649	1,578,095
Furniture and refrigerators.....	151	4,189	166	497	3,526	4,065	7,647,916	619,031	2,009,627	3,841,914	736,207	8,306,258	4,464,344
Gas and electric fixtures and lamps and reflectors.....	141	1,376	38	242	1,096	879	2,083,017	254,323	604,091	812,770	347,055	2,177,032	1,364,262
Gas, illuminating and heating.....	12	3,256	.....	1,063	2,193	6,828	38,272,880	946,176	995,892	3,071,857	2,021,969	12,383,349	9,311,492
Glass.....	14	1,185	1	72	1,112	419	1,251,725	89,431	559,371	497,723	102,995	1,367,246	869,523
Glass, cutting, staining, and ornamenting.....	54	832	55	92	685	599	1,263,651	77,078	383,379	917,803	122,016	1,685,088	767,285
Grease and tallow.....	17	477	32	116	329	847	1,911,998	130,481	175,161	1,661,716	248,741	2,468,171	806,455
Hat and cap materials.....	6	205	6	38	161	185	398,676	33,338	68,394	532,928	125,308	822,369	289,441
Hats and caps, other than felt, straw, and wool.....	42	562	55	43	464	51	426,318	53,570	187,960	412,707	53,696	802,953	390,246
Hats, fur-felt.....	127	6,080	34	221	5,825	4,163	13,337,205	341,435	3,101,108	3,562,883	562,076	10,401,794	6,838,911

¹ Excluding statistics for establishments located outside of the corporate limits of Philadelphia, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

SUMMARY FOR THE PHILADELPHIA METROPOLITAN DISTRICT, BY INDUSTRIES: 1909—Continued.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaries and employees.	Wage earners (average number).								
Hats, straw.....	9	531	7	64	460	85	\$498,430	\$116,568	\$213,979	\$403,000	\$48,652	\$872,135	\$469,135
House-furnishing goods, not elsewhere specified.....	19	610	18	60	532	511	1,262,790	73,034	149,249	995,986	157,346	1,488,736	492,750
Hosiery and knit goods.....	190	19,345	206	898	18,241	9,201	21,139,386	1,024,814	6,466,886	14,447,804	1,881,693	26,830,879	12,383,075
Ice, manufactured.....	54	916	24	139	753	16,617	6,770,889	128,237	510,706	684,893	376,088	2,174,057	1,489,164
Ink, printing.....	8	246	6	75	165	483	742,447	94,362	104,581	622,582	171,841	1,050,113	427,631
Instruments, professional and scientific.....	32	725	28	107	590	701	1,359,768	114,865	350,822	226,525	116,438	924,367	697,842
Iron and steel, steel works and rolling mills.....	21	10,078	6	879	9,193	48,598	32,725,245	1,306,326	6,330,367	12,800,813	1,777,109	23,990,217	11,189,404
Iron and steel, bolts, nuts, washers, and rivets, not made in steel works or rolling mills.....	9	900	7	84	809	1,573	2,185,994	99,582	355,571	732,560	172,987	1,405,688	673,128
Iron and steel forgings.....	14	486	8	72	406	1,769	1,682,423	106,781	287,806	600,533	87,948	1,185,675	585,142
Jewelry.....	52	411	69	47	295	110	664,396	37,611	186,454	426,784	69,873	884,433	457,649
Labels and tags.....	12	344	11	68	275	314	453,056	55,150	126,316	259,549	56,084	568,859	309,310
Leather goods.....	88	2,115	112	279	1,724	465	2,743,425	373,519	789,857	2,163,672	208,045	4,039,367	1,875,695
Leather, tanned, curried, and finished.....	57	8,301	46	503	7,752	10,803	23,208,137	843,194	3,950,336	24,289,672	1,871,332	33,626,349	9,336,677
Liquors, distilled.....	6	140	50	30	60	549	1,269,000	42,189	70,096	383,126	535,165	935,966	552,340
Liquors, malt.....	52	2,410	32	423	1,955	14,031	29,919,166	1,095,199	1,511,845	4,169,247	6,328,271	15,179,357	11,010,110
Looking-glass and picture frames.....	39	431	51	44	336	145	417,367	36,496	174,989	395,988	66,679	830,181	434,193
Lumber and timber products.....	126	4,385	128	342	3,915	9,612	7,329,979	395,456	2,220,513	5,451,508	433,341	9,443,170	3,991,662
Marble and stone work.....	134	2,203	176	134	1,893	3,335	3,510,136	150,162	1,272,640	1,606,161	229,488	3,975,294	2,369,133
Mattresses and spring beds.....	138	408	37	62	309	471	602,928	49,928	138,118	656,779	99,409	1,068,682	411,903
Millinery and lace goods.....	96	3,941	131	275	3,535	569	2,814,129	227,634	1,181,553	3,230,505	511,138	5,921,256	2,690,751
Mineral and soda waters.....	109	611	113	112	386	438	1,403,267	134,547	230,009	748,855	486,637	2,182,368	1,433,613
Mucilage and pastes.....	12	105	8	31	66	193	366,964	55,512	30,225	611,045	51,744	808,054	197,009
Musical instruments, pianos and organs and materials.....	114	501	13	30	458	361	562,611	41,596	155,286	400,101	96,043	775,237	375,136
Oil, not elsewhere specified.....	13	285	10	112	163	713	1,408,900	132,594	97,522	1,571,924	155,894	2,069,023	497,099
Optical goods.....	14	419	12	116	291	110	455,324	89,571	123,330	272,752	61,174	620,693	347,941
Paint and varnish.....	61	2,020	54	415	1,551	5,451	11,677,576	655,624	864,060	6,571,287	898,837	10,107,711	3,536,424
Paper and wood pulp.....	14	1,905	7	133	1,765	14,410	6,991,025	237,336	3,411,994	799,842	5,869,693	2,457,699	
Paper goods, not elsewhere specified.....	38	1,777	35	319	1,423	1,500	3,416,254	328,215	562,590	2,342,113	422,689	3,907,711	1,565,598
Patent medicines and compounds and druggists' preparations.....	194	3,422	164	962	2,296	2,103	10,459,787	1,138,369	962,132	4,328,756	2,315,182	10,098,183	5,769,427
Photographic apparatus and materials.....	7	192	6	39	147	114	456,259	46,591	104,137	416,123	57,292	672,908	256,785
Photo-engraving.....	16	546	15	134	397	105	523,182	140,755	381,086	185,230	123,867	917,108	731,878
Pottery, terra-cotta, and fire-clay products.....	21	967	14	101	852	1,556	2,744,334	140,772	505,707	792,994	260,842	2,020,161	1,227,167
Printing and publishing.....	1,037	21,650	991	6,471	14,188	12,750	43,747,327	5,994,440	8,514,446	15,613,927	8,983,282	46,675,524	31,061,597
Shoddy.....	2	20	32	36	450	2,170	1,627,096	47,039	185,740	1,463,218	74,061	2,051,118	587,900
Silk and silk goods, including throwsters.....	38	3,543	32	270	3,241	2,425	6,355,129	323,449	1,306,130	3,648,776	544,529	6,808,089	3,159,314
Slaughtering and meat packing.....	98	1,633	127	240	1,266	3,712	5,333,504	311,658	899,096	21,922,302	593,046	24,726,467	2,804,165
Soap.....	41	1,336	44	295	997	1,840	4,637,198	346,746	473,442	5,837,845	1,185,448	8,643,437	2,805,592
Soda-water apparatus.....	4	246	6	62	188	180	713,086	44,660	122,242	194,941	141,624	585,189	390,248
Springs, steel, car and carriage.....	5	286	1	28	227	505	644,571	42,249	125,268	254,934	36,116	534,935	280,001
Steam packing.....	26	2,059	15	511	1,533	5,270	6,466,853	424,744	753,577	2,450,619	676,013	4,275,695	1,825,176
Stereotyping and electrotyping.....	16	315	13	39	263	284	283,911	49,321	196,217	113,131	43,495	520,969	407,838
Stoves and furnaces, including gas and oil stoves.....	20	984	18	120	846	891	2,392,606	174,461	550,130	785,586	289,999	2,069,846	1,284,260
Tobacco manufactures.....	558	9,117	601	636	7,880	1,328	9,274,919	768,388	3,089,955	6,049,325	3,265,287	15,577,862	9,528,537
Type founding and printing materials.....	8	405	6	104	295	275	1,086,090	91,660	160,000	196,477	108,236	580,172	383,695
Umbrellas and canes.....	131	1,297	31	100	1,166	1,342	3,413,424	101,891	504,830	1,060,134	114,393	2,074,521	1,014,387
Upholstering materials.....	13	445	10	48	387	810	1,641,174	44,948	177,928	1,094,603	166,737	1,728,857	634,254
Wall paper.....	7	606	1	63	542	770	1,655,254	129,016	258,745	1,228,758	171,211	2,005,354	776,596
Wall plaster.....	5	333	1	64	268	1,416	869,049	90,054	137,475	358,279	90,985	700,053	341,774
Wirework, including wire rope and cable.....	30	634	34	53	547	441	916,039	86,392	290,817	413,798	104,710	1,019,414	605,616
Wood, turned and carved.....	31	466	33	25	408	488	428,326	21,539	158,062	167,495	16,292	537,246	369,751
Woolen, worsted, and felt goods, and wool hats.....	164	27,577	180	917	26,480	47,893	73,339,391	1,666,839	10,538,596	54,478,419	3,651,564	76,261,845	21,783,426
All other industries.....	852	48,107	865	4,542	42,700	112,334	172,592,600	6,114,757	23,544,677	126,461,846	10,379,815	177,832,939	52,371,093

¹ Excluding statistics for establishments located outside of the corporate limits of Philadelphia, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."
² Excluding statistics for one establishment, to avoid disclosure of individual operations. The figures for this establishment are included under the head of "All other industries."

The greatest absolute increase in value of products during the decade in the area under consideration—\$33,423,596, or 78 per cent—is shown for the manufacture of woolen, worsted, and felt goods and wool hats. In this industry the city of Philadelphia ranks second among cities of the United States. The omission of the statistics for one establishment in 1899 has only the slightest effect upon the comparison.

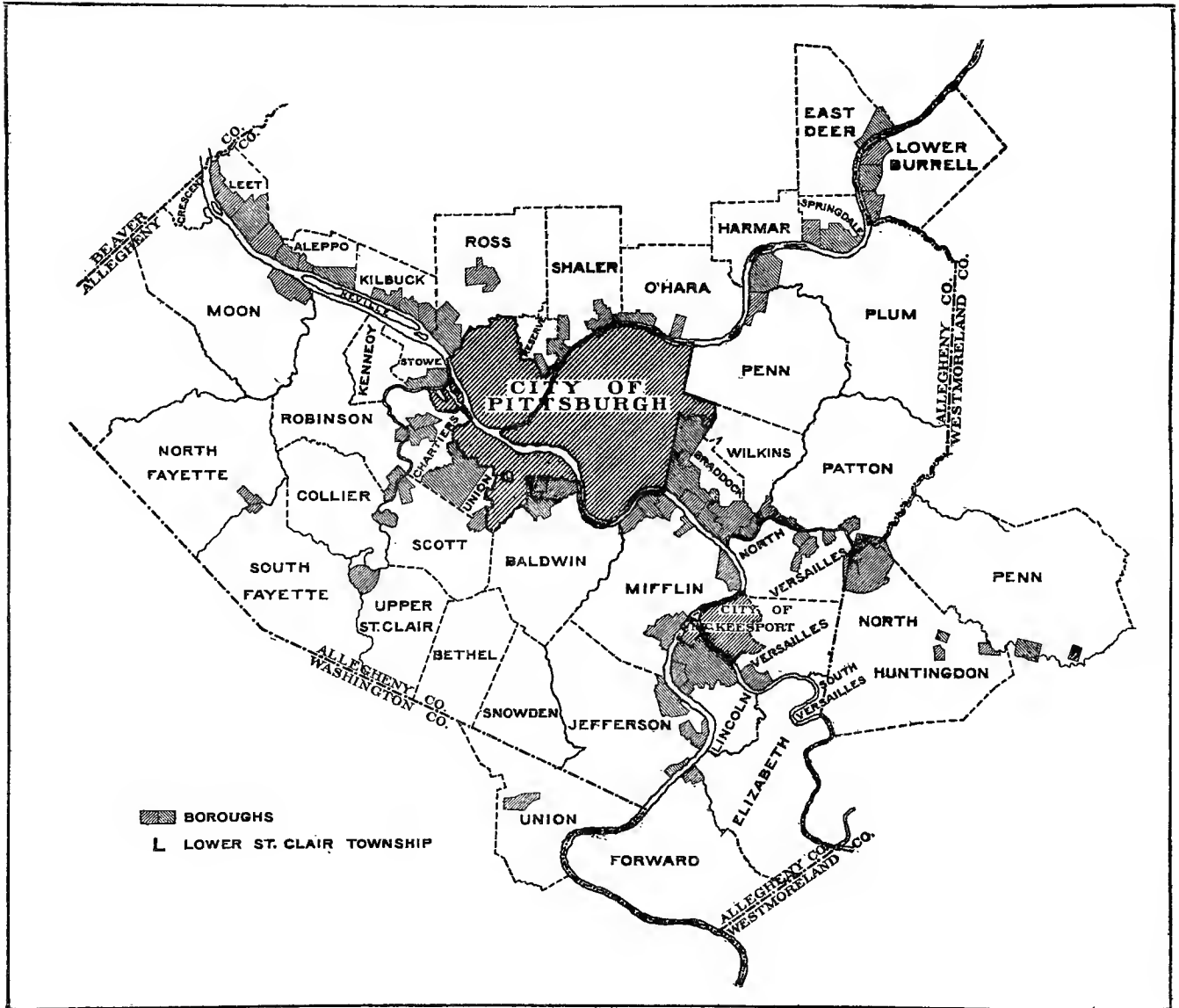
The apparent decrease for the dyeing and finishing of textiles is due to the necessary omission of statistics for two establishments, to present which would disclose the operations of individual establishments. In reality there has been a very considerable increase.

Among the important industries that can not be shown separately, since to do so would disclose the operations of individual establishments, are the refining of sugar and of petroleum, the shipbuilding indus-

try, and the manufacture of locomotives and of oilcloth and linoleum.

The relative gain shown in the table for the manufacture of steam packing is much increased by the inclusion of statistics for this industry from territory added to the district since 1904. The absolute gain in the manufacture of woolen, worsted, and felt goods and wool hats is likewise considerably raised by figures for that part of the industry reported from territory new to the district in 1909. Other prominent industries affected in substantially like measure as the latter are the tanning, currying, and finishing of leather and the manufacture of steel. Omitting from consideration these industries, the greatest relative gain in value of products during the decade was for food preparations, 416.3 per cent; and in absolute gain, for the manufacture of clothing—\$27,640,483.

PITTSBURGH METROPOLITAN DISTRICT: 1909.



PITTSBURGH METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Pittsburgh embraces 405,880 acres of territory, of which 26,511 acres constitute the area of Pittsburgh and 379,369 acres the area of the outside territory. The population of the city of Pittsburgh proper in 1910 was 533,905 and that of the outside territory 510,838, the total for the district being 1,044,743. As defined at the census of 1910, the metropolitan district comprised 119 cities, boroughs, and townships situated in Allegheny, Washington, and Westmoreland Counties; the district covered by the statistics published for 1904 contained only 58 civil divisions, all of which were in Allegheny County.

The following is a list, by counties, of the various cities, boroughs, and townships included in the metropolitan district in 1909:

[Places included in the district in 1904 are indicated by *. Allegheny, Elliott, Esplen, Montooth, Sheraden, Sterrett, and West Liberty, included in 1904 as separate subdivisions, are now part of the city of Pittsburgh.]

ALLEGHENY COUNTY.

Aleppo township.
Aspinwall borough.
*Avalon borough.
*Baldwin township.
*Bellevue borough.
*Ben Avon borough.
Bethel township.
*Braddock borough.
*Braddock township.
Bridgeville borough.
*Carnegie borough.
*Carrick borough.
*Chartiers township.
Cheswick borough.
Clairton borough.
Collier township.
Coraopolis borough.
*Crafton borough.
Crescent township.
*Dormont borough.
*Dravosburg borough.
*Duquesne borough.
East Deer township.
East McKeesport borough.
*East Pittsburgh borough.
*Edgewood borough.
Edgeworth borough.
Elizabeth borough.
Elizabeth township.
*Emsworth borough.
*Etna borough.
Forward township.
Glassport borough.
*Glenfield borough.
*Greentree borough.
Harmar township.
*Hays borough.
Haysville borough.
Heidelberg borough.

ALLEGHENY COUNTY—contd.

*Homestead borough.
*Ingram borough.
Jefferson township.
*Kennedy township.
*Kilbuck township.
*Knoxville borough.
Leet township.
Leetsdale borough.
Lincoln township.
*Lower St. Clair township.
McKeesport city.
*McKees Rocks borough.
*Mifflin township.
*Millvale borough.
Moon township.
*Mount Oliver borough.
*Munhall borough.
*Neville township.
*North Braddock borough.
North Fayette township.
North Versailles township.
Oakdale borough.
Oakmont borough.
O'Hara township.
Osburn borough.
Patton township.
Penn township.
Pitcairn borough.
*Pittsburgh city.
Plum township.
Port Vue borough.
*Rankin borough.
*Reserve township.
*Robinson township.
*Ross township.
*St. Clair borough.
*Scott township.
Sewickley borough.
*Shaler township.

ALLEGHENY COUNTY—contd.

Sharpsburg borough.
Snowden township.
South Fayette township.
South Versailles township.
*Spring Garden borough.
Springdale borough.
Springdale township.
*Stowe township.
*Swissvale borough.
Tarentum borough.
*Thornburg borough.
Trafford borough (part of).
Turtle Creek borough.
Union township.
Upper St. Clair township.
Verona borough.
Versailles borough.
Versailles township.
Wall borough.
West Elizabeth borough.
*West Homestead borough.
*Westview borough.
*Whitaker borough.

ALLEGHENY COUNTY—contd.

*Wilkins township.
*Wilkinsburg borough.
Wilmerding borough.
Wilson borough.

WASHINGTON COUNTY.

Finleyville borough.
Union township.

WESTMORELAND COUNTY.

Arnold borough.
Irwin borough.
Jeannette borough.
Lower Burrell township.
Manor borough.
New Kensington borough.
North Huntingdon township.
North Irwin borough.
Parnassus borough.
Penn borough.
Penn township.
Trafford borough (part of).

The relative location of the constituent divisions is indicated on the outline map of this district on page 928.

Summary for the district.—Table 19 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population, for the Pittsburgh metropolitan district; for the cities of Pittsburgh and McKeesport, and five of the leading boroughs; and for the remainder of the district. The percentage which the figure for Pittsburgh represents of the total for the district is shown in the case of each item. The statistics for Duquesne and North Braddock boroughs are included with the "remainder" of the district to avoid disclosing individual operations.

In 1909 the Pittsburgh metropolitan district had 2,369 manufacturing establishments, which gave employment to an average of 163,258 persons during the year and paid out \$115,049,924 in salaries and wages. Of the persons employed 140,464 were wage earners. These establishments turned out products to the value of \$578,815,493, to produce which materials costing \$366,892,433 were utilized. The value added by manufacture was thus \$211,923,060. The Pittsburgh district ranked fourth in 1909 among all the metropolitan districts of the United States in the value of its manufactured products. It far exceeded any of the others in the value of its iron and steel output.

In the Pittsburgh district, as in the Boston district, the greater part of the value of the manufactured products of the district was reported by factories outside the central city. Pittsburgh contained over one-half (51.1 per cent) of the population of the district of which it is the manufacturing, commercial, and finan-

cial center, and contributed slightly over two-fifths of the value of products for the district (42.1 per cent). Its manufacturing establishments constituted seven-tenths (70 per cent) of all in the district and gave employment to nearly one-half (48.8 per cent) of the average number of wage earners for that area.

Of the places outside Pittsburgh for which statistics are given separately, McKeesport had the largest value of products, representing 7.3 per cent of the total for the metropolitan district. This city contained 4.1 per cent of the total population of the district.

Table 19

	NUMBER OR AMOUNT.										Percent Pitts- burgh is of total for district.
	The district.	Pittsburgh.	District exclusive of Pittsburgh.								
			Total.	McKees- port.	Braddock.	Wilkins- burg.	Home- stead.	McKees Rocks.	Carnegie.	Remainder. ¹	
Population ²	1,044,743	533,905	510,838	42,694	19,357	18,924	18,713	14,702	10,009	386,439	51.1
Number of establishments.....	2,369	1,659	710	68	41	24	26	31	19	601	70.0
Persons engaged in manufactures.....	163,258	79,625	83,633	9,093	1,218	231	248	3,903	509	68,431	48.8
Proprietors and firm members.....	2,102	1,553	549	58	36	21	17	21	17	379	73.9
Salaried employees.....	20,692	10,598	10,094	789	142	25	60	291	70	8,717	51.2
Wage earners (average number).....	140,464	67,474	72,990	8,246	1,040	185	171	3,591	422	59,335	48.0
Primary horsepower.....	791,047	307,666	483,381	49,935	7,332	1,016	890	8,872	1,245	414,091	38.9
Capital.....	\$642,527,046	\$283,138,717	\$359,388,329	\$43,432,669	\$5,368,886	\$534,648	\$1,272,845	\$10,328,079	\$2,371,255	\$296,079,947	44.1
Expenses.....	519,820,653	220,734,609	299,086,044	35,473,003	4,629,078	473,042	558,990	8,467,279	2,908,978	246,575,674	42.5
Services.....	115,049,924	52,655,536	62,394,388	6,921,568	945,215	150,136	160,118	2,644,226	368,935	51,204,190	45.8
Salaries.....	24,934,082	12,682,604	12,251,478	890,769	160,350	20,840	49,353	334,734	93,614	10,701,818	50.9
Wages.....	90,115,842	39,972,932	50,142,910	6,030,799	784,865	129,296	110,765	2,309,492	275,321	40,502,372	44.4
Materials.....	366,892,433	148,526,783	218,365,650	27,295,735	3,347,362	262,265	321,940	5,406,846	2,441,093	179,290,409	40.6
Miscellaneous.....	37,878,296	19,552,290	18,326,006	1,255,700	336,501	60,641	76,932	416,207	98,950	16,081,075	51.6
Value of products.....	578,815,493	243,453,693	335,361,800	42,494,567	5,094,382	538,217	659,196	9,786,828	3,099,445	273,689,165	42.1
Value added by manufacture.....	211,923,060	94,926,910	116,996,150	15,198,832	1,747,020	275,952	337,256	4,379,982	658,352	94,398,756	44.8

¹ Includes Duquesne and North Braddock, the statistics for which can not be shown without disclosing individual operations.

² April 15, 1910.

The group of 112 boroughs and townships, which are not shown separately, with a combined population equal to 37 per cent of the total for the district, contributed 47.3 per cent of the value of its products. The average value of products per establishment for this group of places was much greater than that reported by any of the places shown separately, except McKeesport. A number of the places in this group had a larger output of iron and steel than some of the places for which separate figures are given. Munhall, which adjoins the borough of Homestead, is conspicuous in this regard, followed in importance accord-

ing to the value of iron and steel products by Bessemer, Duquesne, Rankin, Clairton, and Etna.

Comparison with earlier censuses.—Table 20 is a comparative summary of the statistics for the district as a whole for 1909, 1904, and 1899, together with the percentages of increase from census to census. For purposes of comparison with the statistics for the district as given for 1904¹ and 1899,¹ the totals for 1909 are segregated into figures for the territory added since 1904, and into those for the remainder of the district.

¹ Bureau of Census: Industrial Districts, 1905, p. 38.

Table 20

	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹		
	1909			1904	1899	1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ²					
Population.....	³ 1,044,743	³ 237,786	³ 806,967	(⁴)	⁶ 623,342	29.5	.....	.....
Number of establishments.....	2,369	350	2,019	1,859	1,477	36.7	8.6	25.9
Persons engaged in manufactures.....	163,258	32,814	130,444	121,594	(⁵)	.....	7.3	.....
Proprietors and firm members.....	2,102	280	1,822	1,755	(⁵)	.....	3.8	.....
Salaried employees.....	20,692	3,094	17,598	13,775	7,580	132.2	27.8	81.7
Wage earners (average number).....	140,464	29,440	111,024	106,064	94,464	17.5	4.7	12.3
Primary horsepower.....	791,047	140,259	650,788	596,463	(⁵)	.....	9.1	.....
Capital.....	\$642,527,046	\$121,040,694	\$521,486,352	\$443,889,824	\$328,493,963	58.8	17.5	35.1
Expenses.....	519,820,653	97,423,945	422,396,708	351,357,841	290,093,782	45.6	20.2	21.1
Services.....	115,049,924	23,065,373	91,984,551	77,339,055	59,761,743	53.9	18.9	29.4
Salaries.....	24,934,082	3,747,360	21,186,722	16,418,501	7,953,339	166.4	29.0	106.4
Wages.....	90,115,842	19,318,013	70,797,829	60,920,554	51,808,404	36.7	16.2	17.6
Materials.....	366,892,433	67,871,499	299,020,934	242,040,207	209,040,608	43.0	23.5	15.8
Miscellaneous.....	37,878,296	6,487,073	31,391,223	31,978,579	21,291,431	47.4	-1.8	50.2
Value of products.....	578,815,493	112,709,294	466,106,199	383,490,468	339,861,658	37.1	21.5	12.8
Value added by manufacture.....	211,923,060	44,837,795	167,085,265	141,450,261	130,821,050	27.7	18.1	8.1

¹ A minus sign (-) denotes decrease.

² Figures in this column used in computing percentages of increase.

³ April 15, 1910.

⁴ No population census in 1905.

⁵ June 1, 1900.

⁶ Figures not available.

The percentages of increase in value of products and value added by manufacture were greater during the more recent five-year period, 1904-1909, than during the period 1899-1904, but the number of wage earners and salaried employees and the expenditures for services increased at a more rapid rate during the

earlier than during the later period. The percentages of increase during the decade 1899-1909, were much larger in the number of salaried employees and in salaries than for any other items. The average number of wage earners increased only 17.5 per cent during this period, but the wages paid increased 36.7 per cent,

a rate of gain approximately equal to that in value of products, 37.1 per cent. The relative increase in primary horsepower of all kinds from 1904 to 1909 was 9.1 per cent. Statistics as to the primary power used in 1899 are not available.

The proportions of the population and manufactures in the outside territory of the metropolitan district are constantly increasing as is indicated by the percentages in Table 21. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904.

The proportion of the population of the district as originally constituted that was reported from the territory outside of Pittsburgh, increased from 27.6 per cent in 1900 to 33.8 per cent in 1910, and the proportion of the value of products of that district that was contributed by the outlying territory increased steadily from 35.8 per cent in 1899 to 44.9 per cent in 1904, and to 47.8 per cent in 1909.

	PER CENT TERRITORY OUTSIDE OF PITTSBURGH IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904	1899
Population.....	33.8	(²)	27.6
Number of establishments.....	17.8	16.0	11.9
Persons engaged in manufactures.....	39.0	33.1	(³)
Proprietors and firm members.....	14.7	13.6	(³)
Salaried employees.....	39.8	39.9	22.8
Wage earners (average number).....	39.2	32.5	24.0
Primary horsepower.....	52.7	57.2	(³)
Capital.....	45.7	41.3	35.5
Expenses.....	47.7	45.0	35.3
Services.....	42.8	35.9	26.4
Salaries.....	40.1	40.6	20.1
Wages.....	43.5	34.7	27.4
Materials.....	50.3	48.5	38.5
Miscellaneous.....	37.7	40.3	28.5
Value of products.....	47.8	44.9	35.8
Value added by manufacture.....	43.2	38.7	31.4

¹ Based on figures for district as constituted in 1904 and 1899.
² No population census in 1905.
³ Figures not available.

Leading industries.—Table 22 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

SUMMARY FOR THE PITTSBURGH METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All industries.....	2,369	163,258	2,102	20,892	140,464	791,047	\$642,527,046	\$24,834,082	\$30,115,842	\$366,892,433	\$37,878,296	\$578,815,493	\$211,923,080
Brass and bronze products.....	15	822	16	102	704	2,850	4,273,850	146,622	424,736	2,468,600	186,707	3,397,537	928,937
Bread and other bakery products...	391	3,323	427	569	2,327	2,490	6,601,004	539,854	1,244,127	5,403,082	1,028,571	9,568,400	4,165,318
Brick and tile.....	41	911	37	61	813	5,769	2,002,934	364,123	384,936	2,099,966	130,089	908,346	638,380
Canning and preserving.....	111	3,073	14	1,349	1,710	1,811	6,823,389	1,337,569	615,275	2,391,890	1,289,320	6,201,830	3,809,940
Carriages and wagons and materials.	40	644	43	47	554	1,873	1,910,883	50,549	369,519	442,679	57,214	1,031,239	588,560
Cars and general shop construction and repairs by steam-railroad companies.....	16	10,374	.....	936	9,438	15,094	8,684,822	779,132	6,605,681	9,164,034	256,032	16,804,878	7,640,844
Chemicals.....	3	62	.....	14	48	260	446,276	25,365	31,561	391,810	49,278	530,850	139,040
Clothing, men's, including shirts.....	24	1,011	43	102	866	340	1,237,435	87,777	342,412	1,121,773	173,143	1,949,728	827,955
Coffee and spice, roasting and grinding.....	4	80	11	42	27	226	310,795	36,270	14,443	612,460	89,011	810,657	198,197
Confectionery.....	20	955	10	112	833	724	1,538,001	106,063	261,872	1,549,247	158,832	2,284,087	734,840
Cooperage and wooden goods, not elsewhere specified.....	17	237	19	21	197	159	477,176	22,727	108,784	411,717	19,002	656,831	245,114
Copper, tin, and sheet-iron products.	69	1,933	70	143	1,720	4,076	3,925,925	177,858	946,072	2,119,639	282,006	5,254,789	3,135,150
Cutlery and tools, not elsewhere specified.....	20	1,522	22	109	1,391	3,769	3,565,921	160,712	738,757	1,550,084	159,092	3,086,268	1,536,184
Electrical machinery, apparatus, and supplies.....	18	10,867	11	2,826	8,030	13,160	48,184,808	3,240,797	4,760,067	8,521,905	2,148,067	20,260,163	11,738,258
Food preparations.....	16	269	18	46	205	563	672,554	36,366	82,277	634,283	100,747	968,541	334,258
Foundry and machine-shop products	218	22,118	111	3,553	18,454	41,908	70,585,128	4,404,869	12,780,152	24,140,317	4,361,783	52,411,013	28,270,696
Furniture and refrigerators.....	11	373	12	46	315	629	826,412	54,033	187,884	440,447	120,161	900,036	459,589
Glass.....	27	7,322	6	374	6,942	13,632	20,785,023	566,917	3,648,952	3,560,783	969,222	8,765,900	5,205,117
Ice, manufactured.....	31	426	7	104	315	10,136	4,024,177	119,368	214,422	282,327	245,415	1,370,635	1,088,308
Iron and steel, blast furnaces.....	13	6,474	.....	909	5,565	225,192	100,116,105	1,328,843	4,217,097	72,125,803	1,946,926	85,584,235	13,458,432
Iron and steel, steel works and rolling mills.....	54	55,321	.....	4,165	51,156	357,945	234,689,014	5,435,034	35,925,008	158,035,351	9,447,825	237,186,077	79,150,726
Iron and steel, bolts, nuts, washers, and rivets, not made in steel works or rolling mills.....	9	1,055	3	98	954	2,302	2,653,885	134,445	478,137	1,677,205	147,473	2,662,158	984,953
Iron and steel forgings.....	8	590	2	57	531	2,149	1,592,457	72,360	308,299	690,021	118,336	1,336,375	646,354
Leather, tanned, curried, and finished.....	6	273	2	27	244	846	1,552,676	46,455	138,824	913,913	67,848	1,161,603	247,690
Liquors, distilled.....	8	168	6	38	124	1,260	2,074,435	72,322	72,298	732,544	2,516,355	3,649,731	2,917,187
Liquors, malt.....	28	1,589	.....	235	1,354	11,321	24,111,550	473,404	1,060,090	1,936,360	2,070,478	8,236,002	6,299,642
Lumber and timber products.....	86	1,419	90	142	1,187	5,408	3,560,889	155,714	774,708	1,854,023	233,545	3,188,759	1,334,736
Marble and stone work.....	36	424	43	35	346	900	756,255	45,676	242,968	298,671	70,319	737,183	438,512
Mattresses and spring beds.....	16	256	5	28	223	261	574,089	37,525	123,679	337,397	59,640	589,588	252,191
Oil, not elsewhere specified.....	8	110	8	35	67	113	417,523	64,002	36,754	437,834	76,825	730,888	293,054
Paint and varnish.....	24	533	15	146	372	2,463	3,878,767	171,737	209,220	2,638,230	354,286	3,779,518	1,141,288
Patent medicines and compounds and druggists' preparations.....	39	282	28	95	159	320	854,688	124,202	73,084	392,216	319,470	1,146,920	754,704
Petroleum refining.....	7	366	3	59	304	712	2,416,532	77,786	206,322	2,961,208	164,236	3,934,916	973,708
Pottery, terra-cotta, and fire-clay products.....	8	773	5	61	707	1,545	4,399,070	88,009	364,534	506,536	180,390	1,524,037	1,017,501
Printing and publishing.....	324	4,639	325	1,212	3,102	4,663	10,375,382	1,365,389	2,131,206	2,799,651	1,878,380	9,663,449	6,863,728
Shipbuilding, including boatbuilding	8	392	6	30	358	1,070	961,950	54,831	254,059	322,304	36,263	671,294	348,980
Slaughtering and meat packing.....	19	1,181	9	252	920	4,471	4,066,950	319,320	612,745	12,665,447	587,306	14,492,440	1,826,993
Smelting and refining, not from ore	5	74	3	12	59	132	840,542	35,100	48,850	1,800,309	51,743	2,015,171	214,862
Soap.....	11	493	18	215	260	503	1,200,245	106,192	113,416	466,660	475,108	1,232,164	765,504
Springs, steel, car and carriage.....	8	965	2	112	851	1,984	3,878,657	188,651	463,240	1,930,710	145,504	3,168,338	1,237,628
Tobacco manufactures.....	248	3,562	255	168	3,139	213	1,920,770	144,063	865,218	1,200,809	1,129,041	3,713,594	2,512,785
All other industries.....	414	15,997	397	2,005	13,595	45,815	48,808,102	2,406,991	7,634,157	34,692,188	3,397,307	51,249,325	16,557,137

¹ Excluding statistics for establishments located outside of the corporate limits of Pittsburgh, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

The predominant industry of the Pittsburgh metropolitan district is the manufacture of iron and steel. The products of steel works and rolling mills in this district in 1909 were valued at \$237,186,077, of which Pittsburgh¹ alone reported \$82,306,627; the output of blast furnaces was valued at \$85,584,235, Pittsburgh contributing \$20,668,023. The products of the foundries and machine shops had a value of \$52,411,013, of which \$21,690,645 was reported by Pittsburgh. In each instance, therefore, the territory outside the city contributed by far the greater part of the total for the district.

The combined product of steel works and rolling mills and of blast furnaces in the entire district had an aggregate value of \$322,770,312, or 55.8 per cent of the value of products for all industries in the district and 23.4 per cent of the value of products of these two branches of the iron and steel industry in the United

¹Thirteenth Census of the United States: 1910. Volume IX, Manufactures, pp. 1106-9.

States. By adding the value of products of the foundries and machine shops, \$52,411,013, the total becomes \$375,181,325, or 64.8 per cent of the total value of products for all industries in the district. Of this combined total, Pittsburgh alone contributed \$124,665,295, or 21.5 per cent.

Other prominent industries were the manufacture of electrical machinery, apparatus, and supplies, with products valued at \$20,260,163; steam-railroad repair shops, with products valued at \$16,804,878; and slaughtering and meat packing, with products valued at \$14,492,440.

The manufacture of coke is omitted from the table as to include it would disclose the operations of individual establishments.

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and had a value of products amounting to \$2,000,000 or over in 1909, are given in Table 23 for the district as constituted in 1904 and 1899.

COMPARATIVE SUMMARY FOR THE PITTSBURGH METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES: 1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
										Number of establishments.			Wage earners (average number).			Value of products.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Iron and steel industries.....	69	78	79	48,178	46,920	41,943	\$270,939,386	\$226,543,315	\$205,233,498	-12.7	-11.5	-1.3	14.9	2.7	11.9	32.0	19.6	10.
Iron and steel ²	50	50	58	45,616	45,512	39,431	260,725,906	222,182,110	195,981,129	-13.8	.....	-13.8	15.7	0.2	15.4	33.0	17.3	13.
All other iron and steel industries ³	19	28	21	2,562	1,408	2,512	10,213,480	4,361,205	9,252,369	-9.5	-32.1	33.3	2.0	82.0	-43.9	10.4	134.2	-52.
Foundry and machine-shop products.	190	170	(*)	13,979	13,207	(*)	39,081,192	31,837,305	(*)	.....	11.8	.....	5.8	.....	.....	22.8	.....	.....
Slaughtering and meat packing.....	⁶ 14	⁶ 24	⁶ 13	841	897	588	13,106,735	10,085,477	6,051,328	7.7	-41.7	84.6	43.0	-6.2	32.6	116.6	30.0	66.
Cars and general shop construction and repairs by steam-railroad companies.....	12	8	13	6,172	4,585	2,637	11,478,749	6,107,325	2,643,464	-7.7	50.0	-38.5	134.1	34.6	73.9	334.2	87.9	131.
Printing and publishing.....	289	240	162	2,931	2,901	2,423	9,369,029	7,990,843	5,031,179	78.4	20.4	48.1	21.0	1.0	19.7	86.2	17.2	58.
Newspapers and periodicals.....	103	96	56	1,157	1,289	1,295	5,874,748	5,119,240	3,330,540	83.9	7.3	71.4	-10.7	-10.2	-0.5	76.4	14.8	53.
Book and job.....	161	132	85	1,345	1,406	975	2,821,906	2,594,861	1,530,381	89.4	22.0	55.3	37.7	-4.5	44.2	84.4	8.7	69.
All other printing and publishing industries ⁴	25	12	21	431	206	153	672,366	276,742	170,258	19.0	108.3	-42.9	181.7	109.2	34.6	294.9	143.0	62.
Bread and other bakery products.....	328	261	153	2,208	2,045	1,395	8,966,993	6,893,103	3,470,742	114.4	25.7	70.6	58.3	8.0	46.6	158.4	30.1	98.
Liquors, malt.....	21	19	15	1,107	969	614	6,627,755	5,372,943	5,266,755	40.0	10.5	26.7	80.3	14.2	57.8	25.8	23.4	2.
Canning and preserving.....	⁶ 11	⁶ 6	⁶ 5	1,710	1,406	1,444	6,201,830	6,216,778	4,429,382	120.0	83.3	20.0	18.4	21.6	-2.6	40.0	-0.2	40.
Tobacco manufactures.....	232	265	⁶ 213	3,103	3,171	2,123	3,674,907	4,034,717	2,492,001	6.4	-12.5	21.6	46.0	-2.1	49.2	47.5	-8.9	61.
Glass.....	14	14	21	2,508	2,407	2,465	3,637,065	2,875,828	2,824,292	-33.3	.....	-33.3	1.7	4.2	-2.4	28.8	26.5	1.
Brass and bronze products.....	⁶ 12	⁶ 15	9	629	527	231	3,188,424	2,462,427	1,701,183	33.3	-20.0	66.7	172.3	19.4	128.1	87.4	29.5	44.
Paint and varnish.....	21	⁶ 15	7	237	261	243	3,085,665	2,127,065	2,029,135	75.0	40.0	25.0	18.1	-1.4	19.8	52.1	45.1	4.
Petroleum refining.....	4	5	5	219	198	161	2,818,219	2,175,774	1,513,440	-20.0	-20.0	.....	36.0	10.6	23.0	86.2	29.5	43.
Lumber and timber products.....	61	64	45	991	1,083	834	2,636,138	3,141,804	2,406,617	35.6	-4.7	42.2	18.8	-8.9	30.5	9.5	-16.1	30.

¹ A minus sign (-) denotes decrease.

² Includes blast furnaces and steel works and rolling mills.

³ Includes all censuses, "iron and steel, bolts, nuts, washers, and rivets, not made in steel works or rolling mills;" "iron and steel forgings;" "iron and steel pipe wrought;" and "tin plate and terneplate." For 1909 and 1904, "iron and steel, doors and shutters." For 1904, "ordnance and accessories." For 1904 and 1899, "iron and steel, nails and spikes, cut and wrought, including wire nails, not made in steel works or rolling mills." And for 1899, "wire."

⁴ Comparable figures not available.

⁵ Excluding statistics for three establishments, to avoid disclosure of individual operations.

⁶ Excluding statistics for one establishment, to avoid disclosure of individual operations.

⁷ Includes "printing and publishing, music;" "bookbinding and blank-book making;" "engraving, steel and copper plate, including plate printing;" and "lithography."

⁸ Excluding statistics for two establishments, to avoid disclosure of individual operations.

The greatest absolute increase in value of products during the decade in the area under consideration is shown for the manufacture of iron and steel, by steel works and rolling mills and blast furnaces—\$65,705,888, or 32 per cent. The greatest relative increase, 334.2 per cent, was reported for cars and general shop construction and repairs by steam-railroad companies. The manufacture of electrical machinery, apparatus, and supplies is an important industry in this district, but the statistics can not be given in this

table, as to do so would disclose individual operations. Other important industries not shown separately, for the same reason, in this table are, in the order of their importance, the manufacture of iron and steel bolts, nuts, washers, and rivets, not made in steel works or rolling mills; confectionery; springs, steel, car and carriage; and liquors, distilled. Smelting and refining not from the ore, is also omitted, because comparable figures for 1904 can not be given without disclosing individual operations.

BOSTON METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Boston embraces 335,905 acres of territory, of which 26,289 acres constitute the area of Boston and 309,616 acres the area of the outside territory. The population of the city of Boston proper in 1910 was 670,585, and that of the outside territory 849,885, the total for the district being 1,520,470.

As defined for the three censuses, the metropolitan district comprised 14 cities and 33 towns, as follows:

SUFFOLK COUNTY.

Boston city.	Revere town.
Chelsea city.	Winthrop town.

ESSEX COUNTY.

Lynn city.	Salem city.
Marblehead town.	Saugus town.
Nahant town.	Swampscott town.
Peabody town.	

MIDDLESEX COUNTY.

Arlington town.	Newton city.
Belmont town.	Sherborn town.
Cambridge city.	Somerville city.
Everett city.	Stoneham town.
Framingham town.	Wakefield town.
Lexington town.	Waltham city.
Lincoln town.	Watertown town.
Malden city.	Wayland town.
Medford city.	Weston town.
Melrose city.	Winchester town.
Natick town.	Woburn city.

NORFOLK COUNTY.

Braintree town.	Needham town.
Brookline town.	Norwood town.
Canton town.	Quincy city.
Dedham town.	Randolph town.
Dover town.	Wellesley town.
Hyde Park town.	Westwood town.
Milton town.	Weymouth town.

On page 935 is an outline map of the metropolitan district as constituted in 1909, showing the various cities and towns included.

Summary for the district.—Table 24 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the Boston metropolitan district; for the cities of Boston, Cambridge, Chelsea, Everett, Lynn, Malden, Medford, Melrose, Newton, Quincy, Salem, Somerville, Waltham, and Woburn, and the towns of Arlington, Brookline, Framingham, Hyde Park, Peabody, Revere, Wakefield, Watertown, Weymouth, and Winthrop; and for the remainder of the district. The percentage

which the figure for Boston represents of the total for the district is given in the case of each item.

In 1909 the Boston metropolitan district had 5,389 manufacturing establishments, which gave employment to an average of 214,641 persons during the year, and paid out \$132,394,865 in salaries and wages. Of the persons employed, 185,952 were wage earners. These establishments turned out products to the value of \$564,054,506, to produce which materials costing \$315,770,540 were utilized. The value added by manufacture was thus \$248,283,966. The Boston district ranked fifth in 1909 among all the metropolitan districts of the United States in the value of its manufactured products.

In the Boston district, as in the Pittsburgh district, the greater part of the value of the manufactured products of the district was reported by factories outside the central city. Boston contained less than one-half (44.1 per cent) of the population of the district of which it is the manufacturing, commercial, and financial center, and contributed a little more than two-fifths (42.1 per cent) of the value of products. Its manufacturing establishments constituted nearly three-fifths (58.5 per cent) of all in the district, and gave employment to a little more than one-third of the wage earners (37.4 per cent).

Of the places outside of Boston for which statistics are given separately, Lynn had the largest value of products, representing 12.7 per cent of the total for the metropolitan district; but it contained only 5.9 per cent of the total population.

The group of 23 towns that are not shown separately, each having less than 10,000 inhabitants, had a combined population of 8 per cent of the total for the district and contributed 6 per cent of the value of the products.

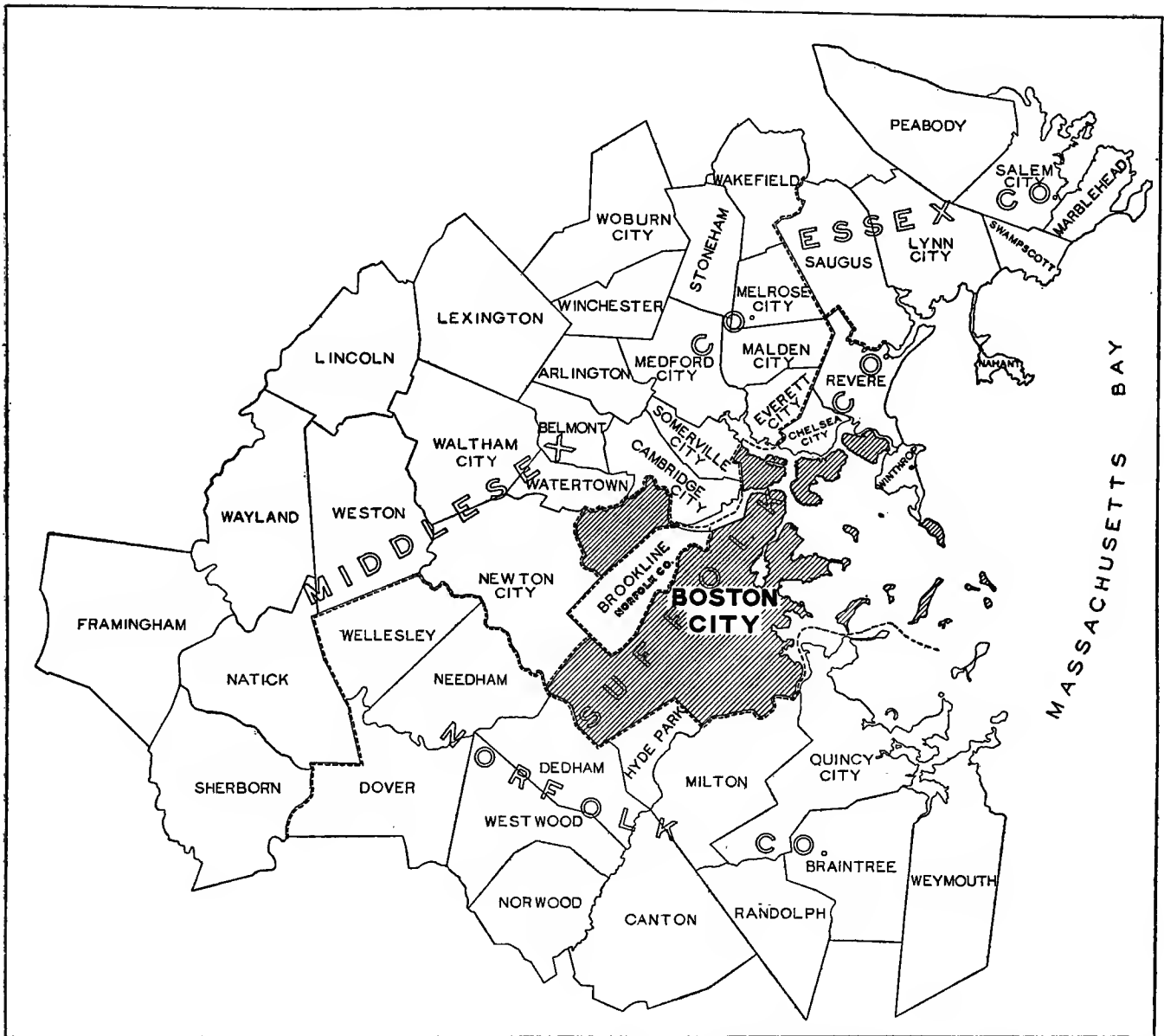
The principal industries of Boston in 1909, as measured by value of products, were printing and publishing and the manufacture of boots and shoes, of clothing, of foundry and machine shop products, and of confectionery. The leading industry of Lynn was the manufacture of boots and shoes, in which it led all other places in the United States. The leading industries of Cambridge were foundry and machine shop products, printing and publishing following; of Somerville, slaughtering and meat packing; of Chelsea, rubber goods; of Peabody, the tanning, currying, and finishing of leather; of Salem, boots and shoes; of Watertown, rubber boots and shoes; and of Quincy, shipbuilding.

Table 24	Population. ¹	Number of establishments.	PERSONS ENGAGED IN MANUFACTURE.				Primary horsepower.	Capital.
			Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).		
The district.....	1,520,470	5,389	214,641	4,989	23,700	185,852	223,888	\$444,558,420
Boston.....	670,585	3,155	85,158	2,873	12,648	69,637	68,419	175,181,571
District exclusive of Boston—total.....	849,885	2,234	129,483	2,116	11,052	116,315	155,467	269,376,849
Arlington.....	11,187	19	335	18	34	283	851	777,613
Brookline.....	27,792	16	404	19	45	340	339	616,841
Cambridge.....	104,839	275	17,475	223	1,992	16,260	21,372	37,928,906
Chelsea.....	32,452	110	6,894	98	642	5,954	8,339	11,020,840
Everett.....	33,484	62	3,096	56	360	2,680	7,816	22,904,539
Framingham.....	12,948	27	3,307	19	219	3,069	4,486	7,770,084
Hyde Park.....	15,507	40	4,649	37	292	4,320	8,358	8,153,338
Lynn.....	89,336	431	30,685	469	2,848	27,368	17,089	42,784,070
Malden.....	44,404	86	3,259	71	288	2,900	3,433	9,910,489
Medford.....	23,150	40	673	33	80	560	1,123	1,595,568
Melrose.....	15,715	25	1,141	21	82	1,038	1,535	2,014,905
Newton.....	39,806	46	2,373	39	160	2,174	4,153	5,689,439
Peabody.....	15,721	74	5,231	55	326	4,850	9,981	16,804,274
Quincy.....	32,642	183	6,247	241	514	5,492	9,147	11,974,782
Revere.....	18,219	14	125	12	12	101	548	661,166
Salem.....	43,697	155	6,852	149	365	6,338	11,436	9,345,244
Somerville.....	77,236	114	5,951	97	674	5,280	6,680	17,282,271
Wakefield.....	11,404	23	2,359	14	115	2,230	1,729	3,864,496
Waltham.....	27,834	80	6,354	67	250	6,087	7,583	12,870,737
Watertown.....	12,876	25	4,805	13	457	4,335	4,862	7,220,006
Weymouth.....	12,895	41	2,238	45	202	1,991	1,902	5,503,936
Winthrop.....	10,132	7	19	6	6	7	41	25,479
Woburn.....	15,308	59	1,867	65	149	1,653	3,660	8,405,106
Remainder.....	121,302	282	13,344	249	1,040	12,055	17,606	25,287,720
Per cent Boston is of total for district.....	44.1	58.6	39.7	57.6	53.4	37.4	30.6	39.4

Table 24	EXPENSES.						Value of products.	Value added by manufacture.
	Aggregate.	Services.			Materials.	Miscellaneous.		
		Total.	Salaries.	Wages.				
The district.....	\$503,201,188	\$132,394,965	\$29,073,548	\$103,321,319	\$315,770,640	\$56,035,761	\$564,054,506	\$248,283,966
Boston.....	211,132,069	55,550,637	15,640,830	39,909,807	124,577,155	31,004,277	237,457,472	112,880,317
District exclusive of Boston—total.....	292,069,097	76,844,228	13,432,716	63,411,512	191,193,385	24,031,484	326,597,034	135,403,649
Arlington.....	587,799	222,825	45,621	177,204	310,930	54,044	695,356	384,426
Brookline.....	469,711	231,848	37,065	194,483	196,048	42,115	532,303	336,255
Cambridge.....	38,452,610	10,769,662	2,404,198	8,365,454	23,565,657	4,117,301	44,227,395	20,661,738
Chelsea.....	15,898,771	4,195,557	869,302	3,326,255	10,568,748	1,134,468	17,002,492	6,433,746
Everett.....	7,514,066	1,979,098	471,250	1,507,848	4,506,266	1,026,701	8,746,923	4,240,657
Framingham.....	5,573,259	1,772,073	325,652	1,446,421	3,411,308	389,880	6,916,864	3,505,558
Hyde Park.....	8,914,496	2,852,513	376,638	2,475,875	3,351,227	710,756	7,336,084	3,984,857
Lynn.....	85,098,219	18,673,532	3,007,714	15,665,818	41,361,087	5,063,599	71,503,140	30,142,053
Malden.....	6,814,078	1,676,775	330,323	1,348,452	4,387,552	749,751	8,205,852	3,818,300
Medford.....	1,828,641	445,874	114,773	331,101	1,249,874	132,893	2,045,289	795,415
Melrose.....	2,364,261	578,648	85,766	492,882	1,588,707	196,906	2,824,669	1,235,962
Newton.....	5,243,565	1,427,171	301,883	1,125,288	3,383,489	432,905	6,278,714	2,895,225
Peabody.....	14,568,353	3,055,531	417,369	2,638,162	10,192,087	1,320,735	15,548,732	5,356,645
Quincy.....	9,739,261	4,239,743	806,103	3,433,640	3,843,867	1,655,651	10,505,403	6,661,636
Revere.....	381,297	65,177	11,085	54,092	292,263	23,857	407,366	115,103
Salem.....	12,680,200	3,289,140	396,354	2,892,786	8,639,856	751,204	14,576,276	5,936,420
Somerville.....	36,581,008	3,561,375	691,567	2,869,808	31,922,882	1,096,771	38,686,527	6,763,665
Wakefield.....	4,302,044	1,202,751	156,791	1,045,960	2,834,960	264,333	5,527,102	2,692,142
Waltham.....	7,133,688	3,684,661	406,369	3,288,292	2,444,341	994,684	7,814,178	5,369,837
Watertown.....	9,708,625	2,674,923	439,918	2,235,005	6,462,761	670,941	11,545,555	5,082,794
Weymouth.....	5,902,901	1,350,229	240,294	1,109,935	4,204,440	348,232	6,627,168	2,422,729
Winthrop.....	36,902	7,311	2,560	4,751	24,994	4,597	42,168	17,174
Woburn.....	4,663,614	1,126,786	194,512	932,274	3,114,507	422,321	5,408,081	2,293,674
Remainder.....	29,611,732	7,751,335	1,299,609	6,451,726	19,335,558	2,524,839	33,593,397	14,257,839
Per cent Boston is of total for district.....	42.0	42.0	53.8	38.6	39.5	66.3	42.1	45.5

¹ April 15, 1910.

BOSTON METROPOLITAN DISTRICT: 1909.



Comparison with earlier censuses.—Table 25 is a comparative summary of the statistics for the district as a whole for 1909, 1904,¹ and 1899,¹ together with the percentages of increase from census to census.

The percentages of increase in average number of wage earners and in wages and miscellaneous expenses—and for total expenses—value of products, and value added by manufacture, were greater during the earlier five-year period, 1899–1904, than during the period 1904–1909. For the decade as a whole the relative increase was greatest in the amounts paid for salaries and for miscellaneous expenses, and in the number of salaried employees. The average number of wage earners increased 41.3 per cent and the amount paid for wages 57 per cent, a gain approximately equal to that in value of products—59.4 per cent. The relative increase in primary horsepower of all kinds from 1904 to 1909 was 38.2 per cent. Statistics as to the primary power used in 1899 are not available.

	NUMBER OR AMOUNT.			PER CENT OF INCREASE. ¹		
	1909	1904	1899	1899–1909	1904–1909	1899–1904
Population.....	2 1,520,470	1 1,354,653	1 1,249,504	21.7	12.2	8.4
Number of establishments.....	5,389	4,870	5,005	7.7	10.7	-2.7
Persons engaged in manufactures.....	214,641	182,270	(^b)	.....	17.8	.....
Proprietors and firm members.....	4,989	5,123	(^b)	.....	-2.6	.....
Salaried employees..	23,700	16,666	12,731	86.2	42.2	30.9
Wage earners (average number).....	185,952	160,481	131,623	41.3	15.9	21.9
Primary horsepower.....	223,886	161,954	(^b)	.....	38.2	.....
Capital.....	\$444,558,420	\$311,088,956	\$266,437,063	66.9	42.9	16.8
Expenses.....	503,201,166	396,582,631	308,584,166	63.1	26.9	28.5
Services.....	132,394,865	102,501,692	79,465,909	66.6	29.2	29.0
Salaries.....	29,073,546	18,637,473	13,671,864	112.7	66.0	36.3
Wages.....	103,321,319	83,864,219	65,794,045	57.0	23.2	27.5
Materials.....	315,770,540	249,836,542	200,057,065	57.8	26.4	24.9
Miscellaneous.....	55,035,761	44,244,397	29,061,192	89.4	24.4	52.2
Value of products.....	564,054,506	457,254,360	353,955,958	59.4	23.4	29.2
Value added by manufacture.....	248,283,966	207,417,818	153,898,893	61.3	19.7	34.8

¹ A minus sign (-) denotes decrease.

² April 15, 1910.

³ State census, May 1, 1905.

⁴ June 1, 1900.

⁵ Figures not available.

¹ Bureau of Census: Industrial Districts, 1905, pp. 32, 33.

The proportions which the population and the statistics of manufactures for the territory outside of Boston represent of the totals for the metropolitan district are shown in Table 26.

The proportion of the population of the district reported from the territory outside of Boston increase from 55.1 per cent in 1900 to 55.9 per cent in 1914 while the proportion of the value of products increase from 54 per cent in 1899 to 57.9 per cent in 1909.

Table 26

	PER CENT TERRITORY OUTSIDE OF BOSTON IS OF TOTAL FOR DISTRICT.		
	1909	1904	1899
Population.....	55.9	56.0	55.1
Number of establishments.....	41.5	43.6	42.5
Persons engaged in manufactures.....	60.3	60.8	(1)
Proprietors and firm members.....	42.4	44.7	(1)
Salaried employees.....	46.6	43.4	39.6
Wage earners (average number).....	62.6	63.1	59.8
Primary horsepower.....	69.4	69.4	(1)
Capital.....	60.6	57.7	51.2
Expenses.....	58.0	59.2	55.5
Services.....	58.0	58.7	54.2
Salaries.....	46.2	43.9	40.2
Wages.....	61.4	62.0	57.1
Materials.....	60.5	62.1	58.9
Miscellaneous.....	43.7	43.5	35.8
Value of products.....	57.9	59.7	54.0
Value added by manufacture.....	54.5	56.7	47.7

¹ Figures not available.

Leading industries.—Table 27 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

The manufacture of boots and shoes is the leading industry in the Boston district. The value of the products in 1909 amounted to 18.3 per cent of the value of the products for all industries. Two industries—printing and publishing and slaughtering and meat packing—each contributed 6.3 per cent of the value of products for the district; and two others—leather tanned, curried, and finished, and foundry and machine-shop products—5.8 per cent and 5.3 per cent respectively.

SUMMARY FOR THE BOSTON METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

Table 27

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All Industries.....	5,389	214,641	4,489	23,700	185,352	223,886	\$444,558,420	\$29,073,546	\$103,321,319	\$315,770,540	\$55,035,761	\$564,054,506	\$248,283.9
Automobiles, including bodies and parts.....	24	1,001	14	139	848	623	1,558,831	138,606	619,408	1,054,842	169,277	2,280,009	1,225.1
Awnings, tents, and sails.....	25	309	29	40	240	46	189,040	31,931	132,216	251,032	37,920	527,045	276.0
Belting and hose, leather.....	15	76	.....	30	46	43	411,771	37,400	35,232	512,504	28,304	698,278	185.7
Blacking and cleansing and polishing preparations.....	52	718	43	207	468	805	1,521,478	301,119	217,058	1,629,244	398,972	3,212,367	1,583.1
Boots and shoes, including cut stock and findings.....	379	38,711	411	2,802	35,498	16,035	40,954,462	2,863,520	19,124,660	68,508,765	5,025,947	103,242,953	34,734.1
Boxes, fancy and paper.....	48	2,377	35	158	2,184	1,242	1,402,661	202,662	867,627	1,678,118	258,364	3,315,959	1,637.8
Brass and bronze products.....	46	1,067	40	73	954	1,973	1,885,918	102,327	617,779	1,664,303	213,430	2,925,298	1,260.9
Bread and other bakery products.....	535	5,018	569	811	3,638	7,887	9,095,032	568,053	2,045,634	8,786,364	1,591,750	14,363,718	5,577.3
Brushes.....	17	1,250	14	108	1,128	382	1,880,065	136,476	447,549	1,158,060	224,376	2,202,880	1,044.8
Canning and preserving.....	28	499	21	122	356	589	1,046,197	137,224	154,354	1,452,880	172,684	2,070,803	617.9
Carriages and wagons and materials. Cars and general shop construction and repairs by steam-railroad companies.....	58	741	72	45	624	849	964,989	41,540	410,246	465,705	90,630	1,213,649	747.9
Cars and general shop construction and repairs by street-railroad companies.....	12	3,855	.....	170	3,685	3,926	3,258,702	154,420	2,385,208	2,336,201	22,298	4,948,127	2,611.9
Carpenteries.....	14	1,018	.....	18	1,000	1,356	1,313,596	23,588	687,288	490,210	14,647	1,215,732	725.5
Chemicals.....	17	892	8	160	734	2,012	2,835,041	226,972	481,179	1,856,886	450,091	3,600,363	1,743.4
Clothing, men's, including shirts.....	210	5,720	268	461	4,991	1,290	6,605,004	579,803	2,484,549	8,116,856	2,292,149	15,252,827	7,135.9
Clothing, women's.....	139	4,740	165	456	4,119	660	2,789,911	442,668	1,857,998	4,771,194	548,834	8,748,500	3,977.3
Coffee and spice, roasting and grinding.....	12	644	10	279	355	936	2,621,518	444,448	193,184	3,879,975	670,652	5,543,838	1,663.8
Coffins, burial cases, and undertakers' goods.....	5	211	5	29	177	327	496,902	28,480	108,416	272,933	44,705	512,893	239.9
Confectionery.....	78	5,659	53	650	4,958	3,378	6,028,139	1,001,577	1,606,018	7,436,106	1,411,233	12,487,864	5,051.7
Cooperage and wooden goods, not elsewhere specified.....	13	405	8	22	375	778	579,993	35,995	201,823	600,678	43,281	937,048	336.3
Copper, tin, and sheet-iron products. Cordage and twine and jute and linen goods.....	99	2,350	94	279	1,977	982	5,174,517	306,472	1,129,482	2,231,785	409,384	4,629,656	2,397.8
Cotton goods, including cotton small wares.....	6	743	1	47	695	1,983	1,940,311	70,491	268,046	1,111,120	100,580	1,608,541	497.4
Cutlery and tools, not elsewhere specified.....	6	2,642	3	47	2,592	7,402	4,691,657	98,211	1,041,391	2,237,334	290,078	4,426,528	2,189.1
Dyeing and finishing textiles.....	32	1,597	32	122	1,443	1,404	2,437,535	190,312	629,494	1,021,080	829,292	3,182,744	2,181.6
Electrical machinery, apparatus, and supplies.....	11	1,288	6	62	1,220	3,699	2,208,627	109,548	571,943	783,910	178,717	2,086,930	1,303.0
Fancy articles, not elsewhere specified.....	53	12,373	19	1,508	10,846	11,462	23,382,474	1,759,833	5,884,212	7,917,558	1,986,290	19,787,013	11,869.4
Flavoring extracts.....	18	327	16	31	280	72	261,429	30,206	114,559	205,962	69,362	506,704	300.7
Food preparations.....	21	123	18	40	65	22	287,345	92,965	30,986	266,922	77,088	611,661	344.7
Foundry and machine-shop products.....	25	456	27	181	248	434	722,543	231,917	143,291	749,275	346,919	1,654,763	905.4
.....	363	16,174	261	2,006	13,907	18,007	38,311,242	2,563,245	8,789,883	11,620,707	3,398,855	29,752,537	18,131.8

¹ Excluding statistics for establishments located outside of the corporate limits of Boston, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

SUMMARY FOR THE BOSTON METROPOLITAN DISTRICT, BY INDUSTRIES: 1909—Continued.

Table 27—Continued.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salariat employees.	Wage earners (average number).								
Fur goods.....	12	267	16	46	205	28	\$722,717	\$30,289	\$149,316	\$545,551	\$82,639	\$936,052	\$390,501
Furnishing goods, men's.....	27	2,141	21	255	1,865	896	2,958,800	379,339	827,326	3,607,193	607,797	6,107,568	2,600,375
Furniture and refrigerators.....	91	3,381	95	290	2,996	4,471	5,546,316	387,882	1,875,336	2,701,662	706,016	6,657,891	3,956,229
Gas, illuminating and heating.....	19	1,195	.....	171	1,024	4,420	36,524,593	202,742	577,181	2,114,345	700,691	6,274,063	4,159,718
Glue.....	8	449	6	43	400	1,591	2,289,349	56,674	160,995	643,781	138,533	970,657	326,876
Grease and tallow.....	15	303	10	55	238	572	685,839	79,855	148,830	805,023	80,072	1,176,442	371,419
Hosiery and knit goods.....	32	2,535	21	129	2,385	1,266	3,031,502	231,230	908,035	2,580,003	270,339	4,940,772	2,360,769
House-furnishing goods, not elsewhere specified.....	14	315	15	26	274	285	620,637	30,639	112,267	558,487	97,357	844,841	286,354
Jewelry.....	42	1,130	40	121	969	555	1,143,398	130,998	487,675	783,603	133,565	1,804,643	1,021,040
Lasts.....	10	260	9	25	226	847	669,600	36,680	186,848	197,286	95,497	604,513	407,227
Leather goods.....	69	1,081	71	160	850	385	986,52	160,180	410,191	1,155,667	185,562	2,094,291	938,624
Leather, tanned, curried, and finished.....	109	9,038	92	513	8,433	15,542	29,511,938	741,561	4,504,568	22,913,876	1,816,609	32,493,668	9,579,792
Liquors, malt.....	120	1,338	2	210	1,126	4,799	13,435,765	478,169	1,019,213	1,956,874	2,434,017	7,553,669	5,596,795
Looking-glass and picture frames.....	26	260	25	60	175	102	325,217	49,632	114,047	204,403	84,296	538,595	334,192
Lumber and timber products.....	123	2,533	120	244	2,169	7,393	3,912,853	281,119	1,438,170	3,187,661	453,444	6,112,989	2,925,328
Marble and stone work.....	195	3,051	258	187	2,606	7,547	3,455,026	225,457	1,931,735	1,624,653	463,931	4,896,578	3,271,925
Mattresses and spring beds.....	35	648	32	98	518	439	665,559	118,917	259,246	1,077,536	191,851	1,826,305	748,769
Millinery and lace goods.....	67	1,894	71	219	1,604	324	1,478,094	252,854	636,167	2,147,694	290,036	3,748,470	1,600,776
Mineral and soda waters.....	54	386	64	94	228	282	933,060	121,140	154,350	465,061	264,934	1,191,833	726,772
Mucilage and paste.....	13	103	9	39	55	482	585,402	61,332	37,719	975,656	87,186	1,260,266	284,610
Musical instruments, pianos and organs and materials.....	34	3,086	20	303	2,763	2,337	8,660,626	464,000	1,767,582	2,634,723	702,856	6,145,903	3,511,180
Oil, not elsewhere specified.....	6	256	3	31	222	563	135,904	47,834	132,784	1,691,743	141,707	7,063,154	376,411
Paint and varnish.....	28	569	13	186	370	1,522	1,752,160	244,575	213,436	1,706,955	363,146	2,904,313	1,197,358
Patent medicines and compounds and druggists' preparations.....	106	1,356	71	378	907	484	3,187,013	495,629	433,865	2,037,322	1,779,165	5,641,942	3,604,620
Photo-engraving.....	20	545	19	120	406	111	379,302	161,538	325,712	139,352	92,251	791,479	652,127
Printing and publishing.....	784	17,289	629	3,948	12,712	9,816	24,070,792	4,611,452	8,721,281	9,475,017	8,114,400	35,796,494	26,321,477
Shipbuilding, including boat building.....	48	3,743	50	313	3,380	3,247	6,918,752	570,509	2,137,903	2,514,333	1,011,058	6,486,527	3,972,194
Silk and silk goods, including throwsters.....	5	524	6	33	485	788	385,355	42,076	175,488	429,238	45,270	759,540	330,302
Slaughtering and meat packing.....	42	2,980	36	340	2,604	3,814	12,846,390	407,791	1,430,903	31,648,702	625,361	35,714,106	4,065,404
Soap.....	25	541	19	137	385	1,063	2,196,412	189,686	189,197	1,955,689	740,651	3,690,126	1,734,437
Soda-water apparatus.....	5	439	1	94	344	741	2,840,180	117,787	227,890	389,747	209,723	1,323,017	933,270
Stationary goods, not elsewhere specified.....	6	423	1	44	378	107	209,595	36,700	151,317	339,256	130,009	744,359	405,103
Stoves and furnaces, including gas and oil stoves.....	7	819	2	107	710	807	1,804,448	169,841	535,127	470,653	193,237	1,507,932	1,037,279
Tobacco manufactures.....	200	2,807	205	188	2,414	70	2,771,842	251,094	1,830,556	2,121,929	832,661	5,719,211	3,597,282
Window shades and fixtures.....	10	134	7	16	111	9	173,888	17,807	61,799	479,878	58,261	667,275	187,397
Woolen, worsted, and felt goods, and wool hats.....	12	1,732	4	93	1,635	5,144	5,279,399	149,597	725,239	3,946,006	302,357	5,609,089	1,663,083
All other industries.....	719	32,106	684	3,291	28,131	50,435	94,129,241	4,036,934	15,043,512	58,475,473	9,112,567	98,908,705	40,428,232

¹ Excluding statistics for establishments located outside the corporate limits of Boston, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and have a value of products amounting to \$4,000,000 or more in 1909, are given in Table 28 for the district for 1909, 1904, and 1899.

The greatest absolute increase in value of products during the decade—\$51,869,122, or 101 per cent—is

shown for boots and shoes. The greatest relative increase, 220.3 per cent, was reported for the manufacture of hosiery and knit goods. Among the more important industries that can not be shown at all in any tables are, in the order of their importance, sugar refining, the rubber boot and shoe industry, and the manufacture of chocolate and cocoa products, of rubber goods, of rubber and woven belting and hose, of clocks and watches, and of paper and wood pulp.

COMPARATIVE SUMMARY FOR THE BOSTON METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES:
1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
	1909	1904	1899	1909	1904	1899	1909	1904	1899	Number of establishments.			Wage earners (average number).			Value of products		
										1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Boots and shoes, including cut stock and findings.....	379	387	448	35,498	28,011	22,707	\$103,242,953	\$67,945,133	\$51,373,831	-15.4	-2.1	-13.6	56.3	26.7	23.4	101.0	52.0	32.
Printing and publishing.....	784	694	697	12,712	10,724	10,677	35,796,494	29,760,753	27,315,573	12.5	13.0	-0.4	19.1	18.5	0.4	31.0	20.3	9.
Newspapers and periodicals.....	251	236	207	3,811	3,452	3,430	16,912,492	16,615,499	13,270,745	21.3	6.4	14.0	11.1	10.4	0.6	27.4	1.8	25.
Book and job.....	430	368	364	5,719	4,843	4,428	13,944,512	9,753,314	10,055,107	18.1	17.5	0.5	29.2	18.1	9.4	38.7	43.0	-3.
Music.....	11	10	9	102	89	160	468,197	505,990	407,634	22.2	.....	11.1	-36.2	14.6	-44.4	14.9	-7.5	24.
All other printing and publishing industries ²	92	82	117	3,080	2,340	2,659	4,471,293	2,885,950	3,582,087	-21.4	12.2	-29.9	15.8	31.6	-12.0	24.8	54.9	-19.
Slaughtering and meat packing.....	42	34	24	2,604	2,464	1,663	35,714,106	31,590,422	19,042,769	75.0	23.5	41.7	56.6	5.7	48.2	87.5	13.1	65.
Leather, tanned, curried, and finished.....	109	104	97	8,433	6,933	4,789	32,493,668	25,071,158	18,602,569	12.4	4.8	7.2	76.1	21.6	44.8	74.7	29.6	34.
Foundry and machine-shop products.....	363	307	(*)	13,907	14,033	(*)	29,752,537	27,385,675	(*)	.....	18.2	.....	-0.9	.....	.....	.....	8.6	.....
Clothing.....	349	258	278	9,110	7,052	5,571	24,001,327	18,819,344	13,551,864	25.5	35.3	-7.2	63.5	29.2	26.6	77.1	27.5	38.
Men's, including shirts.....	210	149	178	4,991	3,855	3,413	15,252,827	12,380,560	9,763,057	18.0	40.9	-16.3	46.2	29.5	13.0	56.2	23.2	26.
Women's.....	139	109	100	4,119	3,197	2,158	8,748,500	6,438,784	3,788,807	39.0	27.5	9.0	90.9	28.8	48.1	130.9	35.9	69.
Textiles.....	78	82	88	10,229	10,071	8,909	21,458,183	18,401,951	13,805,250	-11.4	-4.9	-6.8	14.8	1.6	13.0	55.4	16.6	33.
Woolen, worsted, and felt goods, and wool hats.....	12	14	11	1,635	1,878	1,540	5,609,089	4,116,845	2,370,981	9.1	-14.3	27.3	6.2	-12.9	21.9	136.6	36.2	73.
Hosiery and knit goods.....	32	31	35	2,385	1,365	1,155	4,940,772	2,873,309	1,542,616	-8.6	3.2	-11.4	106.5	74.7	18.2	220.3	72.0	86.
Cotton goods, including cotton small wares.....	6	5	10	2,592	2,839	2,643	4,426,528	3,213,679	3,324,170	-40.0	20.0	-50.0	-1.9	-8.7	7.4	33.2	37.7	-3.
Dyeing and finishing textiles.....	11	14	12	1,220	1,101	1,069	2,086,930	1,590,035	1,398,893	-8.3	-21.4	16.7	14.1	10.8	3.0	49.2	31.3	13.
Cordage and twine and jute and linen goods.....	6	6	8	695	1,195	1,051	1,608,541	3,280,304	2,705,243	-25.0	.....	-25.0	-33.9	-41.8	13.7	-40.5	-51.0	21.
Silk and silk goods, including throwsters.....	5	7	7	485	610	637	759,540	788,321	784,006	-28.6	-28.6	.....	-23.9	-4.9	-19.9	-3.1	-3.7	0.
All other textiles ⁴	6	5	5	1,217	1,183	814	2,026,783	2,539,458	1,679,341	20.0	20.0	.....	49.5	2.9	45.3	20.7	-20.2	51.
Electrical machinery, apparatus, and supplies.....	53	42	38	10,846	7,192	4,484	19,787,013	12,786,569	8,851,042	39.5	26.2	10.5	141.9	50.8	60.4	123.6	54.7	44.
Bread and other bakery products.....	535	531	468	3,638	3,221	3,158	14,363,718	10,883,020	9,282,637	14.3	0.8	13.5	15.2	12.9	2.0	54.7	32.0	17.
Confectionery.....	78	67	56	4,956	3,633	2,309	12,487,864	8,109,237	5,141,966	39.3	16.4	19.6	114.6	36.4	57.3	142.9	54.0	67.
Liquors, malt.....	20	23	25	1,126	950	1,261	7,553,669	6,715,215	7,518,668	-20.0	-13.0	-8.0	-10.7	18.5	-24.7	0.5	12.5	-10.
Furniture and refrigerators.....	91	81	67	2,996	2,833	2,744	6,657,891	5,382,857	5,438,724	16.7	12.3	3.8	9.2	5.8	3.2	22.4	23.7	-1.
Shipbuilding, including boat building.....	48	51	56	3,380	3,481	1,351	6,486,527	6,162,794	2,605,805	-14.3	-5.9	-8.9	150.2	-2.9	157.7	148.9	5.3	136.
Gas, illuminating and heating.....	19	20	24	1,024	806	813	6,274,063	4,482,519	3,755,171	-20.8	-5.0	-16.7	26.0	27.0	-0.9	67.1	40.0	19.
Musical instruments, pianos and organs and materials.....	34	35	36	2,763	3,060	2,414	6,145,903	6,373,907	4,915,586	-5.6	-2.9	-2.8	14.5	-9.7	26.8	25.0	-3.6	29.
Lumber and timber products.....	123	123	89	2,169	2,530	1,645	6,112,989	7,261,235	4,990,269	38.2	.....	38.2	31.9	-14.3	53.8	22.5	-15.8	45.
Tobacco manufactures.....	200	163	163	2,414	2,587	1,881	5,719,211	4,841,685	3,748,480	22.7	22.7	.....	28.3	-6.7	37.5	52.6	18.1	29.
Patent medicines and compounds and druggists' preparations.....	106	88	85	907	780	922	5,641,942	5,767,461	4,175,120	24.7	20.5	3.5	-1.6	16.3	-15.4	35.1	-2.2	38.
Coffee and spice, roasting and grinding.....	12	15	(*)	355	293	(*)	5,543,838	3,479,213	(*)	.....	-20.0	.....	.....	21.2	.....	.....	59.3	.....
Cars and general shop construction and repairs by steam-railroad companies.....	12	13	10	3,685	2,939	2,027	4,948,127	4,008,695	2,527,604	20.0	-7.7	30.0	81.8	25.4	45.0	95.7	23.4	58.
Marble and stone work.....	195	151	(*)	2,606	2,737	(*)	4,896,578	4,461,862	(*)	.....	29.1	.....	.....	-4.8	.....	.....	9.7	.....
Copper, tin, and sheet-iron products.....	99	73	76	1,977	1,477	1,450	4,629,656	3,451,651	2,827,926	30.3	35.6	-3.9	36.3	33.9	1.9	63.7	34.1	22.

¹ A minus sign (-) denotes decrease.
² Includes "bookbinding and blank-book making;" "engraving, steel and copper plate, including plate printing;" and "lithographing."
³ Comparable figures not available.
⁴ Includes "carpets and rugs, other than rag," and "shoddy."
⁵ Excluding statistics for one establishment, to avoid disclosure of individual operations.

ST. LOUIS METROPOLITAN DISTRICT.

Territory included.—The St. Louis metropolitan district, which was the sixth in importance in the United States in manufacturing industries in 1909, embraces 197,993 acres of territory, of which 39,276 acres constitute the area of St. Louis and 158,717 acres the area of the outside territory. The population of the district in 1910 was 828,733 and that of the city of St. Louis proper was 687,029. As defined at the census of 1910, the metropolitan district includes, in addition to the city of St. Louis, Carondelet and Central townships, and Kirkwood city (in Bonhomme, Carondelet, and Central townships) in St. Louis County, Mo.; East St. Louis city, and Canteen, Centerville, and Stites townships in St. Clair County, Ill.; and Nameoki and Venice townships in Madison County, Ill. The part of Kirkwood city in Bonhomme township, Mo., and Nameoki and Venice townships (in which Granite City is situated) have been added to the district as it was constituted for the report for the census of 1905 on Industrial

Districts, Bulletin No. 101. A part of Centerville township was annexed to Belleville city in 1906 and is now outside the district. It is impracticable to segregate statistics for manufacturing establishments, if any, within this small area in 1904 and 1899. Canteen township was organized from a part of Centerville township in 1910. Parts of Centerville township were also added to East St. Louis city in 1908 and 1909.

On page 940 is an outline map of the St. Louis district showing the cities of St. Louis, East St. Louis, and Kirkwood, and the various townships included.

Summary for the district.—Table 29 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the St. Louis metropolitan district, for the cities of St. Louis and East St. Louis, and for the remainder of the district, the percentage which the figure for St. Louis represents of the total for the district being shown in the case of each item.

	NUMBER OR AMOUNT.					Per cent St. Louis is of total for district.
	The district.	St. Louis.	District exclusive of St. Louis.			
			Total.	East St. Louis.	Remainder.	
Population ¹	828,733	687,029	141,704	58,547	83,157	82.9
Number of establishments.....	2,951	2,667	284	139	145	90.4
Persons engaged in manufactures.....	126,453	104,587	21,866	6,005	15,861	82.7
Proprietors and firm members.....	2,045	1,869	176	92	84	91.4
Salaried employees.....	17,873	15,347	2,526	661	1,865	85.9
Wage earners (average number).....	106,535	87,371	19,164	5,252	13,012	82.0
Primary horsepower.....	228,925	163,615	65,310	23,273	42,037	71.5
Capital.....	\$356,356,256	\$269,392,377	\$86,963,879	\$31,297,548	\$55,666,331	75.6
Expenses.....	394,139,219	297,246,790	96,892,429	16,701,465	80,190,964	75.4
Services.....	82,157,263	68,205,900	13,951,363	3,940,653	10,010,710	83.0
Salaries.....	22,612,726	19,670,911	2,941,815	690,549	2,251,266	87.0
Wages.....	59,544,537	48,534,989	11,009,548	3,250,104	7,759,444	81.5
Materials.....	266,552,373	188,189,163	78,363,210	11,440,076	66,923,134	70.6
Miscellaneous.....	45,429,583	40,851,727	4,577,856	1,320,736	3,257,120	89.9
Value of products.....	430,170,244	328,495,313	101,674,931	18,227,960	83,446,971	76.4
Value added by manufacture.....	163,617,871	140,306,150	23,311,721	6,787,884	16,523,837	85.8

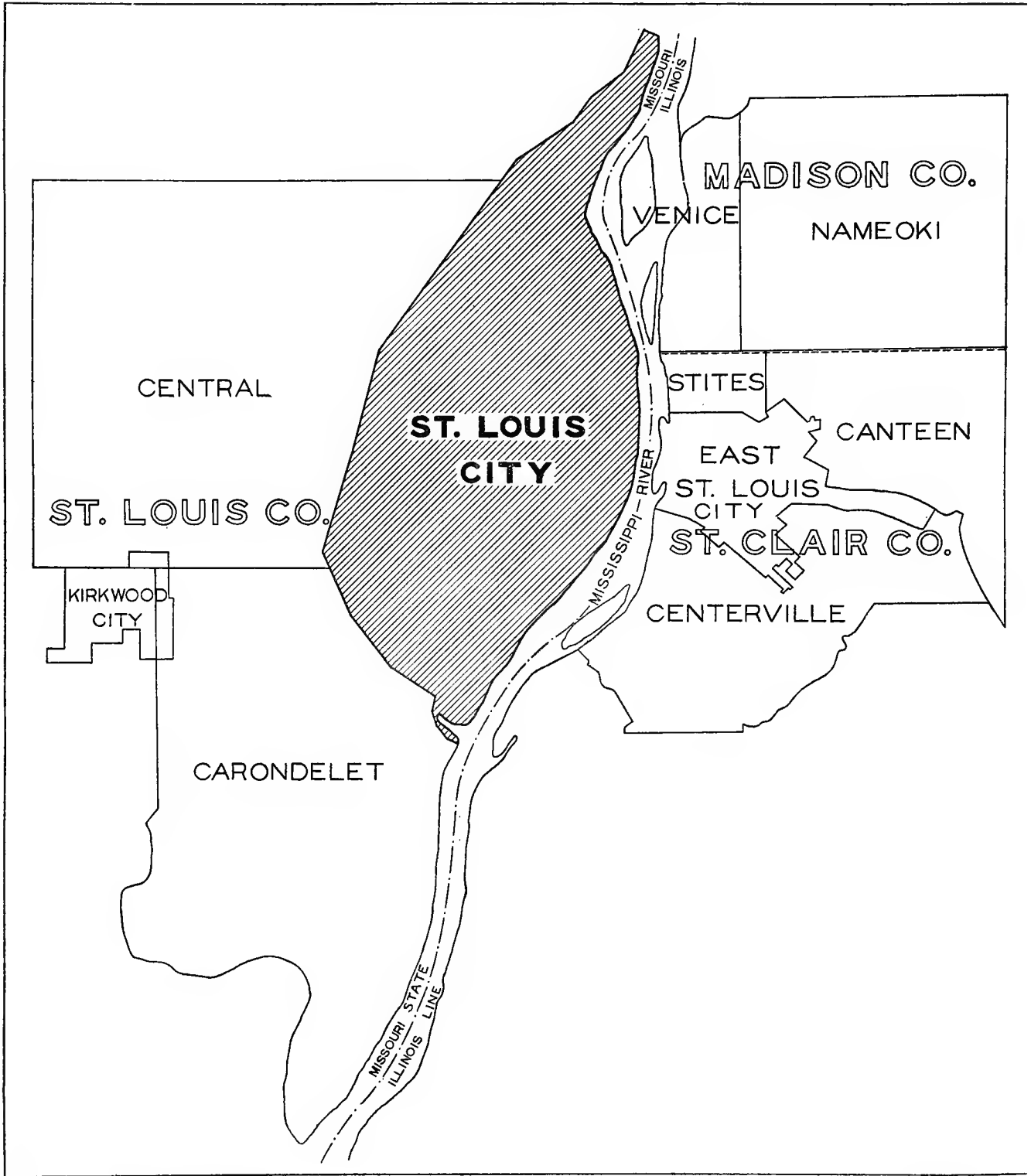
¹ April 15, 1910.

In the St. Louis district, as in Cleveland, Detroit, and all but two of the other districts, the greater part of the value of manufactured products of the district was reported by factories within the central city. St. Louis contained over four-fifths (82.9 per cent) of the population of the district of which it is the manufacturing, commercial, and financial center, and contributed over three-fourths (76.4 per cent) of the value of products for the district. Its manufacturing establishments constituted over nine-tenths (90.4 per cent) of all in the district, and gave employment to more

than four-fifths (82 per cent) of the average number of wage earners for that area. The principal industries of East St. Louis in 1909 were flour mills and grist mills, foundries and machine shops, steel works and rolling mills, and the chemical industry.

Granite City, which is included with the "remainder" of the district, as it was returned as of less than 10,000 population in 1910, has important manufactures, with large values of products. These manufactures include steel, glucose, babbitt metal and solder, tin plate and terneplate, and stamped and enameled ware.

ST. LOUIS METROPOLITAN DISTRICT: 1909.



Comparison with earlier censuses.—Table 30 is a comparative summary for the district as a whole for 1909, 1904, and 1899, together with the percentages of increase from census to census. For purposes of accurate comparison with the statistics for the dis-

trict as given for 1904¹ and 1899,¹ the totals for 1909 are segregated into figures for the territory added since 1904, and into those for the remainder of the district.

¹ Bureau of the Census: Industrial Districts, 1905, p. 45.

Table 30	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹		
	1909			1904	1899	1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ²					
Population.....	828,733	23,954	804,779	(4)	638,134	26.1	.....	.....
Number of establishments.....	2,951	49	2,902	2,603	2,731	6.3	11.5	-4.7
Persons engaged in manufactures.....	126,453	7,314	119,139	106,041	(5)	.....	12.4	.....
Proprietors and firm members.....	2,045	30	2,015	1,944	(5)	.....	3.7	.....
Salaried employees.....	17,873	688	17,185	12,413	9,157	87.7	38.4	35.6
Wage earners (average number).....	106,535	6,596	99,939	91,684	70,556	41.6	9.0	29.9
Primary horsepower.....	228,925	20,344	208,581	131,405	(5)	.....	58.7	.....
Capital.....	\$356,356,256	\$26,042,286	\$330,313,970	\$289,133,806	\$159,634,795	108.9	14.2	81.1
Expenses.....	394,139,219	19,065,226	375,073,993	282,152,003	201,154,271	86.5	32.9	40.3
Services.....	82,157,263	4,518,038	77,639,225	61,913,138	42,087,942	84.5	25.4	47.1
Salaries.....	22,612,726	817,684	21,795,042	14,546,325	10,396,824	109.6	49.8	39.9
Wages.....	59,544,537	3,700,354	55,844,183	47,366,813	31,691,118	76.2	17.9	49.5
Materials.....	266,552,373	13,113,277	253,439,096	180,806,473	131,029,394	93.4	40.2	38.0
Miscellaneous.....	45,429,583	1,433,911	43,995,672	39,432,392	28,036,935	58.9	11.6	40.9
Value of products.....	430,170,244	20,728,878	409,441,366	318,709,859	228,089,639	79.5	28.1	40.2
Value added by manufacture.....	163,617,871	7,615,601	156,002,270	138,903,386	97,060,245	60.7	12.3	43.1

¹ A minus sign (-) denotes decrease.

² Figures in this column used in computing percentages of increase.

³ April 15, 1910.

⁴ No population census in 1905.

⁵ June 1, 1900.

⁶ Figures not available.

The percentage of increase in salaried employees, salaries, and cost of materials was greater during the more recent five-year period, 1904-1909, than during the period 1899-1904. The number of establishments increased during the later five years, while an actual decrease was reported for the earlier period. The percentages of increase during the decade 1899-1909 were much larger in salaries and capital than for any other items. The average number of wage earners increased 41.6 per cent and their wages 76.2 per cent, a rate of gain almost as great as that in value of products—79.5 per cent. The rate of increase in primary horsepower of all kinds from 1904 to 1909 was 58.7 per cent. Statistics as to the primary power used in 1899 are not available.

The proportions of the population and manufactures in the outside territory, as compared with the total for the metropolitan district, are constantly increasing, as is indicated by the percentages in Table 31. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904.

The proportion of the population of the district as originally constituted, reported from the territory outside of St. Louis, increased from 9.9 per cent in 1900

to 14.6 per cent in 1910, and the proportion of the value of products increased steadily from 15.1 per cent in 1899 to 16.4 per cent in 1904 and 19.8 per cent in 1909.

Table 31

Table 31	PER CENT TERRITORY OUTSIDE OF ST. LOUIS IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904	1899
Population.....	14.6	(2)	9.9
Number of establishments.....	8.1	4.6	3.1
Persons engaged in manufactures.....	12.1	9.5	(3)
Proprietors and firm members.....	7.2	3.1	(3)
Salaried employees.....	10.7	8.3	3.2
Wage earners (average number).....	12.6	9.8	8.1
Primary horsepower.....	21.6	17.4	(3)
Capital.....	18.4	8.0	5.7
Expenses.....	20.7	18.1	16.3
Services.....	12.1	9.3	6.8
Salaries.....	9.7	7.4	3.1
Wages.....	13.1	10.0	8.0
Materials.....	25.7	23.8	22.3
Miscellaneous.....	7.1	5.7	2.3
Value of products.....	19.8	16.4	15.1
Value added by manufacture.....	10.1	6.7	5.2

¹ Based on figures for district as constituted in 1904 and 1899.

² No population census in 1905.

³ Figures not available.

Leading industries.—Table 32 gives statistics for 1909 for the industries of the district, having products valued at \$500,000 or more, so far as separate figures can be presented.

SUMMARY FOR THE ST. LOUIS METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaries and employes.	Wage earners (average number).								
All industries.....	2, 951	126, 453	2, 045	17, 873	106, 535	228, 925	\$366, 356, 258	\$22, 612, 726	\$59, 544, 537	\$286, 552, 373	\$45, 429, 583	\$430, 170, 244	\$163, 617, 871
Automobiles, including bodies and parts.....	11	340	2	56	282	139	620,371	61,895	197,452	726,798	93,499	1,302,283	575,485
Awnings, tents, and sails.....	12	287	2	68	217	81	465,171	65,894	87,089	556,008	63,075	826,487	270,479
Blackening and cleansing and polishing preparations.....	23	164	17	50	97	150	207,608	60,982	52,577	290,656	105,250	570,914	280,258
Boots and shoes, including cut stock and findings.....	33	13,006	3	865	12,138	7,547	10,562,837	990,893	6,169,631	23,735,168	1,644,884	33,970,372	10,235,204
Boxes, fancy and paper.....	19	865	9	66	790	493	680,947	80,560	286,224	463,904	74,375	959,532	495,628
Brass and bronze products.....	11	325	6	50	269	385	963,035	76,162	179,661	1,631,835	74,074	2,164,768	532,933
Bread and other bakery products.....	484	3,476	475	648	2,353	8,086	7,240,585	585,435	1,287,883	4,992,567	893,152	9,047,142	4,054,575
Brick and tile.....	14	2,016	2	79	1,935	3,302	4,972,108	128,560	988,715	660,832	233,268	2,424,352	1,763,520
Canning and preserving.....	19	293	10	92	191	161	975,608	97,421	75,296	628,066	87,598	962,193	334,127
Carriages and wagons and materials.....	85	2,608	63	256	2,289	3,173	5,209,760	362,377	1,261,795	3,867,741	409,728	6,401,405	2,533,664
Cars and general shop construction and repairs by steam-railroad companies.....	12	2,930	-----	140	2,790	2,644	2,084,188	134,168	1,636,377	1,328,248	41,290	3,140,082	1,811,834
Clothing, men's, including shirts.....	50	5,246	32	463	4,751	879	5,419,636	581,726	1,966,168	5,382,012	700,988	9,687,421	4,305,409
Clothing, women's.....	158	2,745	49	257	2,439	438	2,050,468	301,456	1,021,016	2,901,808	326,582	4,886,052	1,984,244
Coffee and spice, roasting and grinding.....	23	1,091	6	515	570	1,886	4,547,171	697,362	268,406	7,217,065	740,472	9,513,595	2,296,530
Coffins, burial cases, and undertakers' goods.....	6	596	-----	106	490	608	1,173,575	132,066	268,230	664,539	184,358	1,371,092	706,553
Confectionery.....	25	1,453	14	217	1,222	823	1,747,211	349,724	512,420	2,174,939	440,694	3,848,422	1,673,483
Cooperage and wooden goods, not elsewhere specified.....	28	1,174	16	84	1,074	2,921	1,993,922	111,762	554,888	1,847,839	187,141	3,009,209	1,161,370
Copper, tin, and sheet-iron products.....	126	3,632	113	355	3,164	2,031	6,632,822	428,466	1,580,170	4,851,264	489,289	8,018,879	3,167,615
Electrical machinery, apparatus, and supplies.....	116	912	7	206	699	650	1,523,842	265,414	380,114	636,129	267,054	2,080,635	1,444,506
Fertilizers.....	4	186	-----	50	136	780	192,025	68,375	62,153	384,450	49,963	638,439	253,989
Flavoring extracts.....	8	165	3	88	74	55	355,894	104,156	28,794	264,230	78,766	622,676	358,446
Flour-mill and gristmill products.....	16	355	4	105	246	4,082	2,252,576	152,634	144,915	5,853,913	220,359	6,578,904	724,991
Food preparations.....	121	559	18	159	382	966	2,377,416	206,776	169,722	3,498,913	259,348	4,454,774	955,861
Foundry and machine-shop products.....	176	7,800	83	1,107	6,610	11,009	17,581,220	1,415,475	4,239,599	8,125,592	1,534,408	17,338,198	9,212,606
Furnishing goods, men's.....	9	289	8	56	225	10	337,737	54,525	82,937	391,022	33,065	679,722	288,700
Furniture and refrigerators.....	165	3,310	22	406	2,882	5,163	5,689,684	504,488	1,620,135	2,735,029	578,957	6,110,965	3,375,936
Gas and electric fixtures and lamps and reflectors.....	7	257	4	51	202	185	490,237	64,956	126,313	285,412	48,406	547,446	262,034
Ice, manufactured.....	13	264	-----	42	222	8,790	2,384,270	50,472	172,067	312,303	44,511	805,644	493,341
Iron and steel, steel works and rolling mills.....	9	6,293	-----	579	5,714	21,004	19,921,785	591,813	3,444,688	6,264,040	1,262,804	12,037,791	5,773,751
Jewelry.....	8	268	4	40	224	117	147,673	31,842	152,947	228,493	33,034	532,637	304,144
Leather goods.....	132	1,204	21	223	960	663	2,292,601	271,519	514,931	1,629,336	359,916	3,108,131	1,478,795
Leather, tanned, curried, and finished.....	9	246	3	23	220	519	1,478,051	42,487	145,548	1,598,865	51,646	2,034,979	436,114
Liquors, malt.....	14	5,598	-----	589	5,009	26,102	47,252,731	1,128,556	2,484,681	6,691,627	8,313,901	24,191,737	17,500,110
Lumber and timber products.....	86	3,574	36	420	3,118	10,077	7,121,163	496,848	1,852,297	4,432,065	431,959	8,197,133	3,765,068
Marble and stone work.....	44	705	34	83	588	1,188	1,321,432	120,852	495,983	762,294	130,149	1,670,011	907,717
Millinery and lace goods.....	18	655	13	128	514	64	440,308	97,111	182,561	548,877	102,493	1,045,408	496,531
Mineral and soda waters.....	44	355	29	100	226	152	559,123	95,613	115,089	179,944	109,775	611,266	431,322
Paint and varnish.....	123	869	1	270	598	2,139	4,661,187	398,199	315,048	3,738,225	552,908	5,564,021	1,825,796
Paper goods, not elsewhere specified.....	9	404	3	41	360	269	657,021	57,724	150,670	380,044	96,286	796,028	415,984
Patent medicines and compounds and druggists' preparations.....	199	1,626	87	677	862	800	4,506,796	879,642	364,259	2,280,680	1,730,626	6,846,391	4,565,711
Pottery, terra-cotta, and fire-clay products.....	113	2,246	2	195	2,049	4,230	8,776,838	294,825	1,060,843	634,417	327,657	2,682,754	2,048,337
Printing and publishing.....	375	8,685	246	2,258	6,181	14,736	13,138,946	2,859,936	4,051,105	5,258,278	3,505,974	17,785,074	12,526,796
Roofing materials.....	4	81	2	23	56	120	386,914	21,092	31,353	435,179	44,680	565,917	130,738
Slaughtering and meat packing.....	28	6,354	19	976	5,359	13,148	18,107,879	1,057,528	3,065,827	74,920,220	1,826,870	81,903,483	6,983,263
Stoves and furnaces, including gas and oil stoves.....	13	2,048	2	373	1,673	1,826	7,254,137	535,244	1,198,582	2,457,524	774,328	5,923,388	3,465,864
Wirework, including wire rope and cable.....	19	832	6	143	683	853	2,241,838	247,129	364,932	1,697,227	375,121	3,323,043	1,625,816
All other industries.....	750	28,066	569	4,095	23,402	63,471	124,637,914	5,250,586	14,132,446	66,006,756	15,494,902	109,389,449	43,382,693

¹ Excluding statistics for establishments located outside of the corporate limits of St. Louis, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Among the 46 industries shown separately in the table there are 10 for which totals for the district can not be published, because to do so would disclose individual operations; and 16 which were not carried on in the part of the district which is outside the corporate limits of St. Louis. In all these cases the statistics shown are figures for St. Louis exclusively.

The most important industry in the St. Louis metropolitan district, measured by value of products, was slaughtering and meat packing, while the manufacture

of boots and shoes was second in this respect, but led in average number of wage earners and wages. The establishments in the boot and shoe industry, all of which were within the city limits, contributed over two-thirds of the value of products for this industry reported for the state. The tobacco industry, for which separate figures can not be given without disclosing the operations of individual establishments, ranked third, followed by the manufacture of malt liquors.

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products reported for such of the industries as can be shown separately and had a value of products amounting to \$4,000,000 or more in 1909 are given in Table 33 for 1909, 1904, and 1899.

The greatest absolute increase in value of products during the decade in the area under consideration was reported for the slaughtering and meat-packing industry—\$41,186,839, or 101.2 per cent. The greatest relative increase, 383.1 per cent, is shown for the manufacture of copper, tin, and sheet-iron products, but as figures for one establishment are omitted from the total for the industry for 1899, in order to

avoid disclosing individual operations, the actual percentage of increase in this industry is less than that shown in the table. Moreover, the increase shown is due, in part, to the inclusion of a large establishment in Granite City, which was not a part of the district for 1904 and 1899. The manufacture of boots and shoes, including cut stock and findings, shows exceptional development during the decade, the average number of wage earners in the industry having increased 124.9 per cent and the value of products 300.3 per cent. The total for steel works and rolling mills is considerably increased for 1909 by the addition of statistics for establishments not included in the district as constituted for 1904.

COMPARATIVE SUMMARY FOR THE ST. LOUIS METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES:
1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
										Number of establishments.			Wage earners (average number).			Value of products.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Slaughtering and meat packing.....	28	26	31	5,359	4,938	3,019	\$81,903,483	\$57,960,808	\$40,716,644	-9.7	7.7	-16.1	77.5	8.5	63.6	101.2	41.3	42.4
Boots and shoes, including cut stock and findings.....	33	22	35	12,138	9,331	5,398	33,970,372	19,662,388	8,487,020	-5.7	50.0	-37.1	124.9	30.1	72.9	300.3	72.8	131.7
Liquors, malt.....	14	2 ²⁸	2 ²⁸	5,009	4,947	2,670	24,191,737	20,930,462	11,673,599	-50.0	-50.0	.....	87.6	1.3	85.3	107.2	15.6	79.3
Printing and publishing.....	375	375	336	6,181	5,905	4,297	17,785,074	16,475,759	10,939,864	11.6	.....	11.6	43.8	4.7	37.4	62.6	7.9	50.6
Book and job.....	207	188	175	3,865	3,541	2,336	8,484,969	7,740,475	4,430,502	18.3	10.1	7.4	65.5	9.1	51.6	91.5	9.6	74.7
Newspapers and periodicals.....	124	150	130	1,698	1,682	1,281	8,328,800	7,545,139	5,494,315	-4.6	-17.3	15.4	32.6	1.0	31.3	51.6	10.4	37.3
All other printing and publishing industries ⁴	44	37	31	618	682	680	971,305	1,190,145	1,015,047	41.9	18.9	19.4	-9.1	-9.4	0.3	-4.3	-18.4	17.2
Foundry and machine-shop products.....	176	148 ³	(⁵)	6,610	6,438	(⁵)	17,338,198	12,990,668	(⁵)	.....	18.9	.....	.....	2.7	.....	.....	33.5	.....
Clothing.....	108	99	178	7,190	5,646	5,461	14,573,473	9,925,417	9,303,208	-39.3	9.1	-44.4	31.7	27.3	3.4	56.6	46.8	6.7
Men's, including shirts.....	50	53	136	4,751	3,942	3,504	9,687,421	6,850,351	6,315,762	-63.2	-5.7	-61.0	35.6	20.5	12.5	53.4	41.4	8.5
Women's.....	58 ³	46	42	2,439	1,704	1,957	4,886,052	3,075,066	2,987,446	38.1	26.1	9.5	24.6	43.1	-12.9	63.6	58.9	2.9
Iron and steel, steel works and rolling mills.....	9	6	(⁵)	5,714	2,587	(⁵)	12,037,791	4,797,866	(⁵)	.....	50.0	.....	.....	120.9	.....	.....	150.9	.....
Coffee and spice, roasting and grinding.....	23	19	20	570	484	419	9,513,595	6,725,109	4,765,564	15.0	21.1	-5.0	36.0	17.8	15.5	99.6	41.5	41.1
Bread and other bakery products.....	484	322 ²	396	2,353	1,933	1,433	9,047,142	6,319,019	4,912,543	22.2	50.3	-18.7	58.7	21.7	30.3	84.2	43.2	23.6
Lumber and timber products.....	86	70 ²	55 ³	3,118	3,039	2,251	8,197,133	5,644,664	4,288,351	56.4	22.9	27.3	38.5	-2.6	35.0	91.1	45.2	31.6
Copper, tin, and sheet-iron products.....	126	67	44 ³	3,164	1,750	741	8,018,879	4,483,335	1,660,018	186.4	88.1	52.3	327.0	80.8	136.2	383.1	78.9	170.1
Patent medicines and compounds and druggists' preparations.....	99 ⁶	95 ²	86	862	861	861	6,846,391	5,182,444	4,664,118	15.1	4.2	10.5	0.1	0.1	.....	46.8	32.1	11.1
Flour-mill and gristmill products.....	16	9 ²	18	246	196	281	6,578,904	3,974,437	4,557,507	-11.1	77.8	-50.0	-12.5	25.5	-30.2	44.4	65.5	12.8
Carriages and wagons and materials.....	85	102	108 ¹	2,289	2,239	2,028	6,401,405	5,809,708	4,657,170	-21.3	-16.7	-5.6	12.9	2.2	10.4	37.5	10.2	24.7
Furniture and refrigerators.....	65 ²	51 ²	40 ³	2,882	2,364	2,283	6,110,965	4,057,216	3,268,765	62.5	27.4	27.5	26.2	21.9	3.5	87.0	50.6	24.1
Stoves and furnaces, including gas and oil stoves.....	13	14 ²	(⁵)	1,673	1,875	(⁵)	5,923,388	5,523,277	(⁵)	.....	-7.1	.....	.....	-10.8	.....	.....	7.2	.....
Paint and varnish.....	23 ⁷	25 ²	18	598	552	448	5,564,021	5,909,089	3,868,746	27.8	-8.0	38.9	33.5	8.3	23.2	43.8	-5.8	52.7
Food preparations.....	21 ³	24	23	382	490	381	4,454,774	2,409,270	1,694,555	-8.7	-12.5	4.3	0.3	22.0	28.6	162.9	84.9	42.2

¹ A minus sign (-) denotes decrease.

² Excluding statistics for two establishments, to avoid disclosure of individual operations.

³ Excluding statistics for one establishment, to avoid disclosure of individual operations.

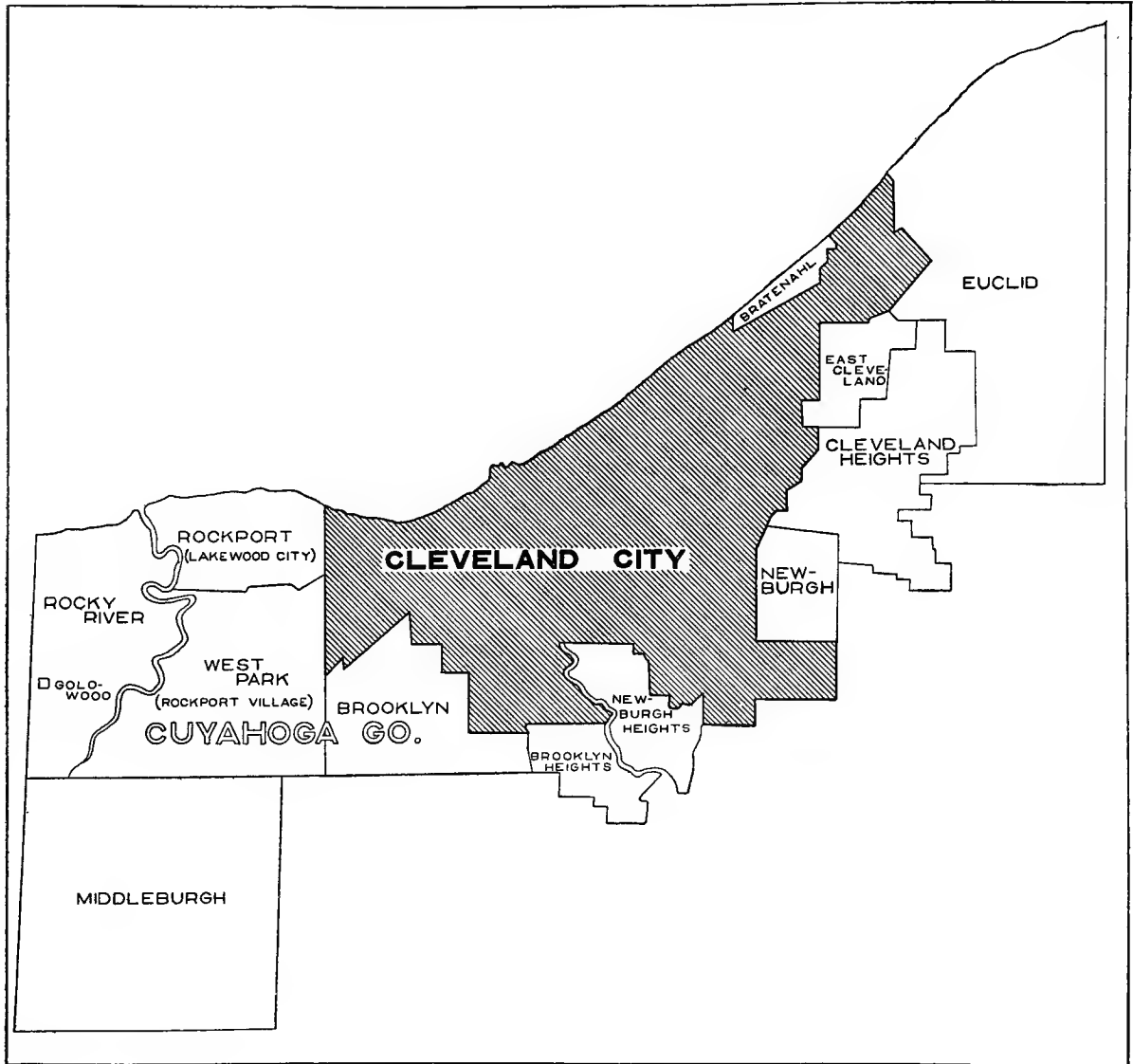
⁴ Includes "printing and publishing, music;" "bookbinding and blank-book making;" "engraving, steel and copper plate, including plate printing;" and "lithographing."

⁵ Comparable figures not available.

⁶ Excluding statistics for three establishments, to avoid disclosure of individual operations.

⁷ Excluding statistics for four establishments, to avoid disclosure of individual operations.

CLEVELAND METROPOLITAN DISTRICT: 1909.



CLEVELAND METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Cleveland embraces 103,174 acres of territory, of which 29,209 acres constitute the area of Cleveland and 73,965 acres the area of the outside territory. The population of the city of Cleveland proper in 1910 was 560,663, and that of the outside territory 52,607, the total for the district being 613,270. As defined at the census of 1910, the metropolitan district includes the central city, together with Bratenahl, Brooklyn, Brooklyn Heights, Cleveland Heights, East Cleveland, Euclid, Goldwood, Middleburgh, Newburgh, Newburgh Heights, Rockport, Rocky River, and West Park townships in Cuyahoga County. The industrial district covered by the report on industrial districts for the census of 1904 (Bulletin No. 101) did not include Middleburgh township, but it comprised, in addition to the territory represented by the other places named above, the area which now constitutes Bedford, Independence, South Newburgh, and Warrensville townships. Glenville township (the part which remained after the organization of Bratenahl township in 1904), part of Brooklyn township, and part of Newburgh Heights township were added to Cleveland in 1905; Corlett township, which formed part of Newburgh township in 1904, was annexed in 1909; and part of what was Collinwood township in 1904 was annexed in 1910. Goldwood township was organized from part of Rocky River township in 1910.

The location of each of the constituent divisions of the district is indicated on the outline map (p. 944).

Summary for the district.—Table 34 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the Cleveland metropolitan district, for the city of Cleveland, and for the remainder of the district, the percentage which the figure for Cleveland represents of the total for the district being shown in the case of each item.

In 1909 the Cleveland metropolitan district had 2,230 manufacturing establishments, which gave employment to an average of 103,709 persons during the year, and paid out \$66,805,430 in salaries and wages. Of the persons employed, 89,088 were wage earners. These establishments turned out products to the value of \$281,992,131, to produce which materials costing \$159,896,454 were utilized. The value added by manufacture was thus \$122,095,677. The Cleveland district ranked seventh in 1909 among the metropolitan districts of the United States in the value of its manufactured products.

The percentages which the figures relating to manufacturing industries in the central city in 1909 form of the total for the district are higher than in any other of the districts except two—Detroit, which exceeds in percentage of establishments and salaried employees, and Minneapolis-St. Paul, where the concentration is greater in 7 of the 15 items shown. They are remarkable for their small degree of variation, ranging from 92.5 per cent for primary horsepower to 97 per cent in the case of proprietors and firm members.

Table 34	NUMBER OR AMOUNT.			Per cent Cleveland is of total for district.
	The district.	Cleveland.	District exclusive of Cleveland. ¹	
Population ²	613,270	560,663	52,607	91.4
Number of establishments.....	2,230	2,148	82	96.3
Persons engaged in manufactures.....	103,709	98,686	5,023	95.2
Proprietors and firm members.....	1,771	1,718	53	97.0
Salaried employees.....	12,850	12,240	610	95.3
Wage earners (average number).....	89,088	84,728	4,360	95.1
Primary horsepower.....	216,168	199,898	16,268	92.5
Capital.....	\$236,911,140	\$227,397,484	\$9,513,656	96.0
Expenses.....	254,566,810	245,390,440	9,176,370	96.4
Services.....	66,805,430	63,558,820	3,246,610	95.1
Salaries.....	16,150,153	15,505,849	644,304	96.0
Wages.....	50,655,277	48,052,971	2,602,306	94.9
Materials.....	159,896,454	154,815,023	4,981,431	96.9
Miscellaneous.....	27,864,926	26,816,807	948,329	96.6
Value of products.....	281,992,131	271,960,833	10,031,298	96.4
Value added by manufacture.....	122,095,677	117,045,810	5,049,867	95.9

¹ Includes Lakewood city, coextensive with Rockport township, the statistics for which can not be shown without disclosing individual operations.

² April 15, 1910.

Comparison with earlier censuses.—Table 35 is a comparative summary of the statistics for the district as a whole for 1909, 1904, and 1899, together with the percentages of increase from census to census. For purposes of accurate comparison the totals for 1909 have been adjusted by segregating the figures for the territory added since 1904; and those for 1904 and 1899 by segregating the figures for the territory deducted since 1904.

The percentage of increase in all items shown except capital was greater during the more recent five-year period, 1904–1909, than during the period 1899–1904. The percentage of increase during the decade 1899–1909 was considerably larger in salaries, miscellaneous expenses, and number of salaried employees than for any other items. The average number of wage earners increased only 56.4 per cent, but the wages increased 86.1 per cent, a rate of increase considerably less than that in value of products, 98.6 per cent. The relative increase in primary horsepower of all kinds from 1904 to 1909 was 36.9 per cent. Statistics as to the primary power used in 1899 are not available.

Table 35

	NUMBER OR AMOUNT.									PER CENT OF INCREASE.		
	1909			1904			1899			1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹			
Population.....	2 613,270	2 7,080	2 606,190	(²)	(²)	(²)	4 420,608	4 5,523	4 414,985	46.1	.....	.....
Number of establishments.....	2,230	9	2,221	1,720	21	1,699	1,423	17	1,406	58.0	30.7	20.8
Persons engaged in manufactures.....	103,709	128	103,581	76,671	612	76,059	(³)	(³)	(³)	.....	36.2	.....
Proprietors and firm members.....	1,771	2	1,769	1,629	11	1,618	(³)	(³)	(³)	.....	16.5	.....
Salaries employees.....	12,850	17	12,833	7,341	54	7,287	5,189	26	6,163	148.6	76.1	41.1
Wage earners (average number).....	89,088	109	88,979	67,861	547	67,254	57,222	326	56,897	56.4	32.3	18.2
Primary horsepower.....	216,166	213	215,953	159,297	1,516	157,781	(³)	(³)	(³)	.....	36.9	.....
Capital.....	\$236,911,140	\$175,137	\$236,736,003	\$164,691,287	\$1,773,818	\$162,917,469	\$105,381,527	\$698,423	\$104,683,104	128.1	45.3	58.6
Expenses.....	254,566,810	166,977	254,399,833	160,593,829	1,117,785	159,476,044	121,538,825	427,823	121,111,002	110.1	59.6	31.7
Services.....	66,805,430	61,847	66,743,583	44,216,685	390,559	43,826,126	32,962,656	193,111	32,769,545	103.7	52.3	33.7
Salaries.....	16,150,153	17,33	16,132,816	8,859,767	88,484	8,771,283	5,614,108	39,600	5,574,508	189.4	83.9	67.3
Wages.....	50,655,277	44,510	50,610,767	35,356,918	302,075	35,054,843	27,348,548	153,511	27,195,037	86.1	44.4	28.9
Materials.....	159,896,454	95,125	159,801,329	100,783,886	596,355	100,187,531	77,956,319	220,416	77,735,909	105.6	59.5	28.9
Miscellaneous.....	27,864,926	10,005	27,854,921	15,593,258	138,871	15,454,387	10,619,850	14,302	10,605,548	162.6	80.1	45.8
Value of products.....	281,992,131	205,791	281,786,340	179,184,277	1,300,824	177,883,453	142,464,823	604,754	141,860,069	98.6	58.4	26.4
Value added by manufacture.....	122,095,677	110,666	121,985,011	78,400,391	704,469	77,695,922	64,508,504	384,344	64,124,160	90.2	67.0	21.2

¹ Figures in this column used in computing percentages of increase.
² April 15, 1910.

³ No population census in 1905.
⁴ June 1, 1900.

⁵ Figures not available.

The proportions which the population and manufactures outside of the city of Cleveland represent of the totals for the metropolitan district are shown for 1909, 1904, and 1899 in Table 36. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904; and those for 1904 and 1899 upon the figures for the district exclusive of the territory deducted.

Except for population and number of establishments, for which the proportion in the outside territory decreased, there was an increase in the percentages for every item shown from census to census. However, from 1904 to 1909 some items show an increase, while others show a decrease. The proportion of the value of products contributed by the territory outside of the city of Cleveland increased steadily from 1.8 per cent in 1899 to 3.4 per cent in 1904 and 3.5 per cent in 1909.

A considerable area has been annexed to the city of Cleveland since 1904, but it is not practicable to ascertain the figures for the manufacturing establishments reported therefrom. The fact that losses or only slight gains in the relative importance of the outside territory are shown in 1909 as compared with

1904 for most of the items in the table is due in part to these annexations.

Table 36

	PER CENT TERRITORY OUTSIDE OF CLEVELAND IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904 ²	1899 ²
Population.....	7.5	(³)	8.0
Number of establishments.....	3.3	4.9	4.0
Persons engaged in manufactures.....	4.7	4.9	(⁴)
Proprietors and firm members.....	2.9	4.8	(⁴)
Salaries employees.....	4.6	5.6	1.9
Wage earners (average number).....	4.8	4.8	2.7
Primary horsepower.....	7.4	4.3	(⁴)
Capital.....	3.9	4.0	3.3
Expenses.....	3.5	3.2	1.8
Services.....	4.8	4.7	2.4
Salaries.....	3.9	5.4	2.2
Wages.....	5.1	4.6	2.5
Materials.....	3.1	2.6	1.6
Miscellaneous.....	3.4	2.7	1.4
Value of products.....	3.5	3.4	1.8
Value added by manufacture.....	4.0	4.3	1.9

¹ Based on figures for district as constituted in 1909, exclusive of territory added since 1904.

² Based on figures for district as constituted in 1904, exclusive of territory deducted since 1904.

³ No population census in 1905.

⁴ Figures not available.

Leading industries.—Table 37 gives the statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

SUMMARY FOR THE CLEVELAND METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All industries.....	2,230	103,709	1,771	12,860	89,088	216,186	\$236,911,140	\$16,150,153	\$50,655,277	\$159,896,454	\$27,864,826	\$281,982,131	\$122,095,877
Automobiles, including bodies and parts.....	32	7,115	20	687	6,408	9,135	16,600,162	875,471	4,022,846	10,417,034	2,719,144	21,403,926	10,986,892
Boots and shoes, including cut stock and findings.....	6	631	8	66	557	304	466,861	84,441	226,339	509,505	38,574	951,470	441,965
Boxes, fancy and paper.....	6	790	.....	51	739	647	823,648	67,539	265,692	626,986	110,064	1,140,581	513,595
Brass and bronze products.....	28	931	23	107	801	872	2,736,769	120,863	518,327	1,362,392	214,408	2,567,768	1,205,376
Bread and other bakery products.....	210	1,732	213	267	1,252	14	2,619,019	312,142	820,767	2,766,288	441,383	4,812,449	2,046,181
Brick and tile.....	16	640	11	31	598	2,235	1,046,947	48,588	317,216	226,617	90,069	861,131	634,514
Cars and general shop construction and repairs by steam-railroad companies.....	9	3,256	.....	268	2,988	3,470	1,410,633	252,986	1,922,294	2,726,481	50,565	4,952,326	2,225,845
Chemicals.....	5	557	.....	88	469	1,540	1,671,754	140,581	307,084	978,241	168,026	1,885,957	887,716
Clothing, men's, including shirts.....	93	3,166	110	311	2,745	348	3,318,688	373,505	1,095,644	3,202,770	722,112	5,953,321	2,750,551
Clothing, women's.....	96	6,226	100	708	5,418	771	4,940,583	1,126,263	2,903,174	6,496,487	1,311,241	12,788,775	6,292,288
Confectionery.....	16	908	10	95	803	679	1,294,403	149,651	253,390	1,553,118	328,825	2,851,927	1,298,809
Cooperage and wooden goods, not elsewhere specified.....	10	289	9	19	261	533	500,289	35,501	136,266	470,501	46,516	708,106	237,605
Copper, tin, and sheet-iron products.....	37	1,531	32	135	1,364	1,231	4,781,532	182,547	639,659	1,627,901	230,011	2,966,478	1,338,575
Cutlery and tools, not elsewhere specified.....	115	1,662	11	207	1,444	3,246	4,097,006	227,837	759,362	664,732	418,631	2,395,436	1,730,704
Electrical machinery, apparatus, and supplies.....	140	1,899	20	301	1,578	1,980	3,308,386	346,012	760,159	1,780,067	595,849	4,035,808	2,255,741
Food preparations.....	17	237	19	35	183	284	269,060	48,291	69,163	448,041	76,933	718,176	270,135
Foundry and machine-shop products.....	239	20,622	125	2,357	18,140	24,759	42,445,280	3,187,777	10,624,367	15,559,650	3,913,638	37,929,051	22,369,401
Furniture and refrigerators.....	125	557	19	71	467	578	660,051	72,665	288,072	490,742	65,200	1,068,551	577,809
Gas and electric fixtures and lamps and reflectors.....	17	409	16	67	326	199	313,359	96,495	192,863	228,775	85,045	653,709	424,934
Hosiery and knit goods.....	13	1,366	12	119	1,234	407	1,894,348	184,747	484,818	1,812,809	227,440	2,967,248	1,144,439
Iron and steel, steel works and rolling mills.....	114	8,278	2	738	7,538	60,575	25,086,577	848,567	5,149,604	28,039,016	1,635,726	38,463,316	10,424,300
Iron and steel, bolts, nuts, washers, and rivets, not made in steel works or rolling mills.....	110	2,663	.....	177	2,486	3,760	6,125,408	253,680	1,175,605	3,001,215	232,357	5,428,356	2,427,141
Iron and steel forgings.....	110	544	4	56	484	2,174	1,809,719	75,190	301,978	504,055	83,174	992,693	488,638
Leather, tanned, curried, and finished.....	4	124	1	15	108	422	385,757	18,170	69,155	468,162	36,671	636,153	167,991
Liquors, malt.....	11	904	5	155	744	3,395	9,887,715	357,945	593,579	1,484,143	1,861,581	6,124,478	3,640,335
Lumber and timber products.....	56	1,528	26	155	1,347	5,959	2,647,629	177,290	799,965	2,869,205	244,914	4,299,586	1,430,351
Millinery and lace goods.....	6	536	4	60	472	143	458,565	83,214	189,979	720,461	33,450	1,206,250	479,789
Oil, not elsewhere specified.....	10	171	2	114	55	93	332,669	150,192	35,466	594,367	101,239	978,544	384,177
Paint and varnish.....	124	1,258	5	493	760	2,624	5,393,459	704,448	468,471	3,886,978	823,090	6,138,466	2,249,488
Patent medicines and compounds and druggists' preparations.....	150	322	56	141	125	66	429,277	123,731	62,188	315,940	353,854	1,010,113	694,173
Printing and publishing.....	250	4,688	176	1,398	3,114	3,334	6,957,828	1,505,926	2,013,158	2,732,781	2,069,088	9,645,012	6,865,231
Slaughtering and meat packing.....	135	1,336	28	232	1,076	2,570	3,555,435	259,535	599,489	15,398,662	478,696	17,192,048	1,793,386
Stoves and furnaces, including gas and oil stoves.....	20	2,097	7	247	1,843	1,899	4,092,596	281,126	1,155,072	2,286,206	689,340	4,977,096	2,680,890
Tobacco manufactures.....	258	2,240	282	91	1,867	2,299	925,101	135,376	734,479	1,047,764	561,484	2,772,661	1,724,917
Wirework, including wire rope and cable.....	117	1,219	6	159	1,054	1,760	2,224,887	209,892	657,620	1,171,177	242,764	2,472,290	1,301,113
All other industries.....	525	21,278	409	2,629	18,240	73,833	71,496,840	3,031,963	10,042,977	41,369,205	6,543,627	67,069,857	25,700,652

¹ Excluding statistics for establishments located outside of the corporate limits of Cleveland, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

The 35 industries shown separately in the table include 10 for which totals for the district can not be published, because to do so would disclose individual operations; and 18 which were not carried on in the part of the district which is outside the corporate limits of Cleveland. In all these cases the statistics shown are figures for Cleveland exclusively.

The principal industry of the Cleveland metropolitan district in 1909, measured by value of products, was steel works and rolling mills, closely followed by foundries and machine shops. The latter industry, however, ranked first in all other items except primary horsepower and cost of materials. The automobile industry, with products valued at \$21,403,926,

occupied third place. Slaughtering and meat packing, the making of women's clothing, printing and publishing, the paint and varnish industry, and the manufacture of men's clothing were among the leading industries of the district. The blast-furnace industry was also important, but it can not be shown separately without disclosing the operations of individual establishments.

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and had a value of products amounting to \$4,000,000 or more in 1909 are given in Table 38 for 1909, 1904, and 1899.

COMPARATIVE SUMMARY FOR THE CLEVELAND METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES:
1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
										Number of establishments.			Wage earners (average number).			Value of products.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Iron and steel, steel works and rolling mills.....	14	9	(3)	7,538	8,577	(3)	\$38,463,316	\$32,279,437	(3)	.....	55.6	.....	.....	-12.1	.....	.....	.....	19.2
Foundry and machine-shop products.	239	170	(3)	18,140	13,632	(3)	37,929,051	24,916,327	(3)	.....	40.6	.....	.....	33.1	.....	.....	.....	62.2
Automobiles, including bodies and parts.....	32	10	(3)	6,408	1,800	(3)	21,403,926	4,624,080	(3)	.....	220.0	.....	.....	256.0	.....	.....	.....	362.9
Clothing.....	189	148	195	8,163	4,876	3,829	18,742,096	10,406,100	\$7,623,647	-3.1	27.7	-24.1	113.2	67.4	27.3	145.8	80.1	36.5
Women's.....	96	78	77	5,418	3,394	2,362	12,788,775	7,427,553	4,213,248	24.7	23.1	1.3	129.4	59.6	43.7	203.5	72.2	76.3
Men's, including shirts.....	93	70	118	2,745	1,482	1,467	5,953,321	2,978,547	3,410,399	-21.2	32.9	-40.7	87.1	85.2	1.0	74.6	96.9	-12.7
Slaughtering and meat packing.....	35	19	10	1,076	978	577	17,192,048	10,616,214	7,514,470	250.0	84.2	90.0	86.5	10.0	69.5	128.8	61.9	41.3
Printing and publishing.....	250	192	129	3,114	2,303	1,972	9,648,012	6,158,562	4,356,625	93.8	30.2	48.8	57.0	35.2	16.8	121.6	56.7	41.4
Newspapers and periodicals.....	86	79	438	851	758	710	4,655,256	3,365,938	2,073,324	126.3	8.9	107.9	19.9	12.3	6.8	124.6	38.3	62.3
Book and job.....	132	89	69	1,836	1,273	981	4,093,203	2,366,858	1,787,106	91.3	48.3	29.0	87.2	44.2	29.8	129.1	73.0	32.4
All other printing and publishing industries.....	32	24	22	427	272	281	899,553	425,766	496,195	45.6	33.3	9.1	52.0	57.0	-3.2	81.3	111.3	-14.2
Paint and varnish.....	24	20	16	760	575	391	6,138,466	3,700,467	2,902,471	50.0	20.0	25.0	94.4	32.2	47.1	111.5	65.9	27.5
Iron and steel, bolts, nuts, washers, and rivets, not made in steel works or rolling mills.....	10	8	7	2,486	1,962	1,305	5,428,356	3,620,854	2,405,856	42.9	25.0	14.3	90.5	26.7	50.3	125.6	49.9	50.5
Liquors, malt.....	11	9	10	744	601	477	5,124,478	3,986,069	4,033,915	10.0	22.2	-10.0	56.0	23.8	26.0	27.0	28.6	-1.2
Stoves and furnaces, including gas and oil stoves.....	20	17	(3)	1,843	1,527	(3)	4,977,096	3,004,963	(3)	.....	17.6	.....	.....	20.7	.....	.....	.....	65.6
Cars and general shop construction and repairs by steam-railroad companies.....	9	4	10	2,988	1,313	1,443	4,952,326	1,681,267	1,584,977	-10.0	60.0	-40.0	107.1	127.6	-9.0	212.6	194.6	6.1
Bread and other bakery products.....	210	150	104	1,252	1,249	552	4,812,449	3,649,516	1,625,367	101.9	40.0	44.2	126.8	0.2	128.3	215.6	57.8	99.9
Lumber and timber products.....	56	43	45	1,347	1,091	1,268	4,299,526	3,877,171	2,798,466	24.4	30.2	-4.4	6.2	23.5	-14.0	63.6	10.9	38.6
Electrical machinery, apparatus, and supplies.....	40	30	25	1,578	1,235	1,467	4,035,808	2,652,987	2,551,743	60.0	33.3	20.0	7.6	27.8	-15.8	58.2	52.1	4.0

¹ A minus sign (-) denotes decrease.

² Excluding statistics for one establishment, to avoid disclosure of individual operations.

³ Comparable figures not available.

⁴ Excluding statistics for two establishments, to avoid disclosure of individual operations.

⁵ Includes "printing and publishing, music;" "bookbinding and blank-book making;" "engraving steel and copper plate, including plate printing;" and "lithography."

Comparable figures are not available for 1899 for the three most important industries in the district. The greatest absolute and relative increases during the five-year period, 1904-1909, in average number of wage earners and value of products are shown for the manufacture of automobiles, including bodies and parts.

BUFFALO METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Buffalo embraces 132,413 acres of territory, of which 24,791 acres constitute the area of Buffalo and 107,622 acres the area of the outside territory. The population of the city of Buffalo proper in 1910 was 423,715, and that of the outside territory 64,946, the total for the district being 488,661. As defined at the census of 1910 the metropolitan district comprised the cities of Buffalo, Lackawanna, and Tonawanda, and the towns of Cheektowaga, Hamburg, Lancaster, Tonawanda, and West Seneca, all of which are in Erie County, and the city of North Tonawanda in Niagara County.

The industrial district covered by the figures published for 1904 and 1899 did not include Lancaster or North Tonawanda, but comprised, in addition to the territory represented by the other places just mentioned, the towns of Amherst and East Hamburg.

Since the census of 1904 Lackawanna has been incorporated as a city, but the figures for it can not be shown separately, as to do so would disclose the operations of an individual establishment of great importance, which is engaged in the iron and steel and certain related industries. On page 950 is an outline map of the metropolitan district as constituted in 1909, showing the various cities and towns included.

Summary for the district.—Table 39 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the Buffalo metropolitan district, for the cities of Buffalo and North Tonawanda, and for the remainder of the district, the percentage which the figure for Buffalo represents of the total for the district being shown in the case of each item. The statistics for Lackawanna are included in the "remainder" of the district to avoid disclosing individual operations.

Table 39

	NUMBER OR AMOUNT.					Per cent Buffalo is of total for district.
	The district.	Buffalo.	District exclusive of Buffalo.			
			Total.	North Tona- wanda.	Remainder. ¹	
Population ²	488,661	423,715	64,946	11,955	52,991	86.7
Number of establishments.....	1,964	1,753	211	81	130	89.3
Persons engaged in manufactures.....	75,086	61,246	13,840	3,146	10,694	81.6
Proprietors and firm members.....	1,538	1,489	149	56	93	90.9
Salaried employees.....	9,876	8,345	1,531	266	1,265	84.5
Wage earners (average number).....	63,572	51,412	12,160	2,824	9,336	80.9
Primary horsepower.....	322,280	121,791	200,489	15,888	184,601	37.8
Capital.....	\$280,052,887	\$193,041,267	\$87,011,620	\$8,273,779	\$78,737,841	68.9
Expenses.....	249,930,260	195,019,696	54,910,664	8,860,817	46,049,747	78.0
Services.....	47,363,003	38,074,567	9,288,436	1,882,530	7,405,906	80.4
Salaries.....	11,190,444	9,347,339	1,843,105	300,262	1,542,843	83.5
Wages.....	36,172,559	28,727,228	7,445,331	1,582,268	5,863,063	79.4
Materials.....	180,458,300	136,538,241	43,920,059	6,389,208	37,530,851	76.7
Miscellaneous.....	22,108,957	20,406,888	1,702,069	589,079	1,112,990	92.3
Value of products.....	279,852,346	218,803,994	61,048,352	9,599,776	51,448,676	78.2
Value added by manufacture.....	99,394,046	82,265,753	17,128,293	3,210,568	13,917,725	82.8

¹ Includes Lackawanna, the statistics for which can not be shown without disclosing individual operations.

² April 15, 1910.

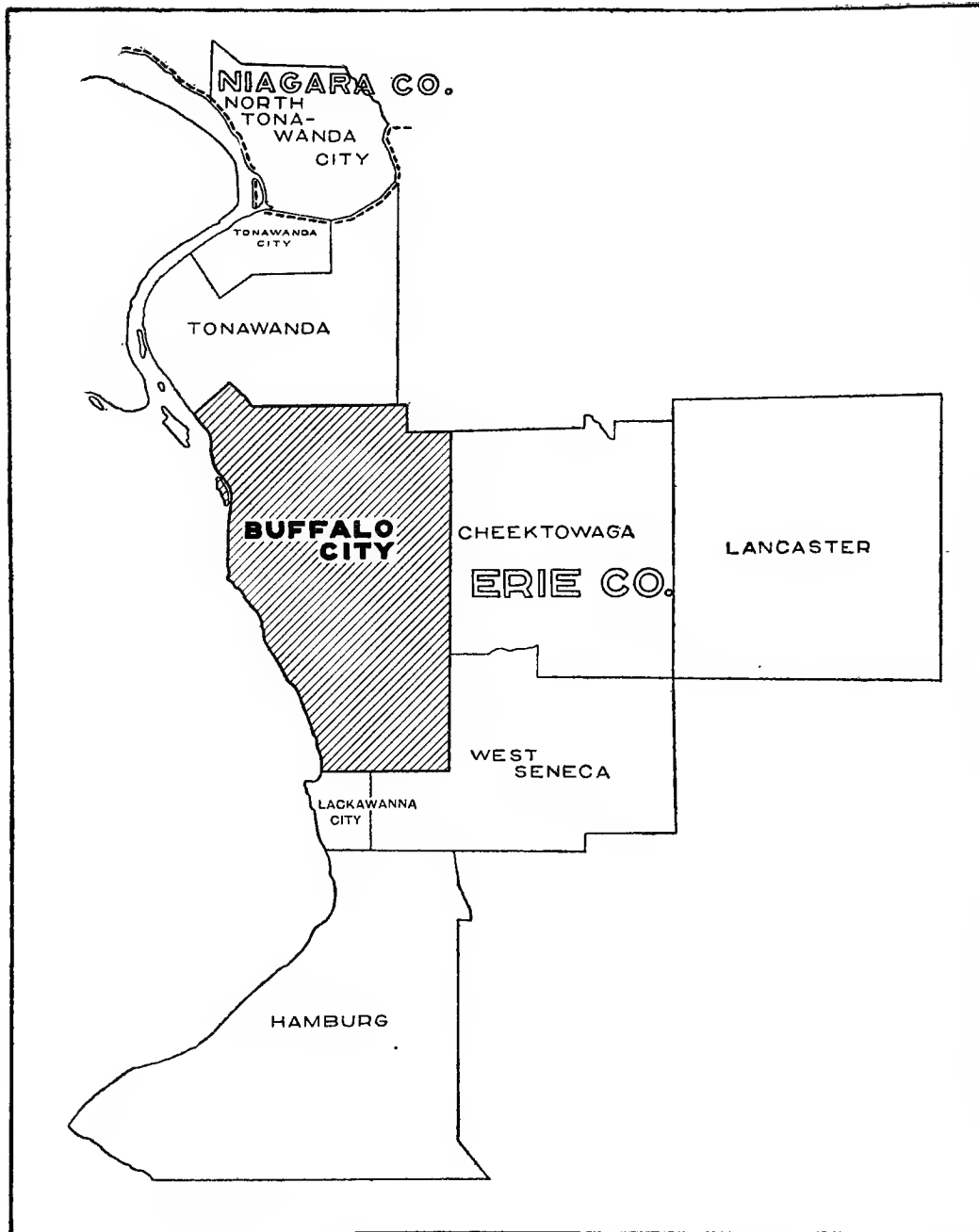
In 1909 the Buffalo metropolitan district had 1,964 manufacturing establishments, which gave employment to an average of 75,086 persons during the year and paid out \$47,363,003 in salaries and wages. Of the persons employed, 63,572 were wage earners. These establishments turned out products to the value of \$279,852,346, to produce which materials costing \$180,458,300 were utilized. The value added by manufacture was thus \$99,394,046. The Buffalo district ranked eighth in 1909 among all the metropolitan districts of the United States in the value of its manufactured products.

The greater part of the value of the manufactured products of the district was reported by factories within the central city. Buffalo contained nearly

nine-tenths (86.7 per cent) of the population of the district of which it is the manufacturing, commercial, and financial center, and contributed nearly eight-tenths (78.2 per cent) of the value of products for the district. Its manufacturing establishments constituted 89.3 per cent of all in the district, and gave employment to 80.9 per cent of the average number of wage earners for that area.

The group of five towns and one city having less than 10,000 population, and Lackawanna city, statistics for which can not be shown separately without disclosing the operations of individual establishments, had a combined population equal to 10.8 per cent of the total for the district and contributed 18.4 per cent of the value of its products.

BUFFALO METROPOLITAN DISTRICT: 1909.



Comparison with earlier censuses.—Table 40 is a comparative summary of the statistics for the district as a whole for 1909, 1904, and 1899, together with the percentages of increase from census to census. For purposes of accurate comparison the statistics for 1909 have been adjusted by segregating the figures for the territory added since 1904; and those for 1904 and 1899 by segregating the figures for the territory deducted since 1904.

The percentage of increase in the items shown, except average number of wage earners and wages, and for capital, services, miscellaneous expenses, and

value added by manufacture, was greater during the more recent five-year period, 1904–1909, than during the period 1899–1904. The percentages of increase during the decade 1899–1909 were especially large in salaries, capital, materials, salaried employees, and miscellaneous expenses. The average number of wage earners increased 60.6 per cent and their wages 98.9 per cent, which was a much less gain than in the value of products—137.9 per cent. The relative increase in primary horsepower of all kinds from 1904 to 1909 was 77.4 per cent. Statistics as to the primary power used in 1899 are not available.

Table 40

	NUMBER OR AMOUNT.									PER CENT OF INCREASE. ¹		
	1909			1904			1899			1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ²	Total.	Territory deducted since 1904.	Remainder of district. ²	Total.	Territory deducted since 1904.	Remainder of district. ²			
Population.....	3 488,661	21,618	467,043	4 423,390	7,068	416,322	5 385,498	6 6,573	5 378,925	23.3	12.2	0.9
Number of establishments.....	1,964	106	1,858	1,631	18	1,615	1,563	12	1,551	19.8	15.0	4.1
Persons engaged in manufactures.....	75,086	3,681	71,425	56,287	103	56,184	(6)	(6)	(6)	.....	27.1	.....
Proprietors and firm members.....	1,638	82	1,556	1,639	18	1,623	(6)	(6)	(6)	.....	- 4.1	.....
Salariated employees.....	9,876	299	9,577	5,854	5	5,849	3,951	4	3,947	142.6	63.7	48.2
Wage earners (average number).....	63,572	3,280	60,292	48,794	82	48,712	37,568	35	37,533	60.6	23.8	29.8
Primary horsepower.....	322,280	16,651	305,629	172,688	431	172,257	(6)	(6)	(6)	.....	77.4	.....
Capital.....	\$280,052,887	\$9,084,435	\$270,968,452	\$188,384,845	\$188,830	\$188,198,016	\$105,094,082	\$102,322	\$104,991,760	158.1	44.0	79.2
Expenses.....	249,930,260	9,472,029	240,458,231	149,666,496	176,181	149,490,314	100,927,024	117,811	100,809,213	138.5	60.9	48.3
Services.....	47,363,003	2,178,889	45,184,114	31,072,320	43,646	31,028,674	20,912,547	18,148	20,894,401	116.2	46.8	48.5
Salaries.....	11,190,444	335,570	10,854,874	6,276,393	5,945	6,270,448	3,634,828	3,440	3,631,388	198.9	73.1	72.7
Wages.....	36,172,559	1,843,319	34,329,240	24,795,927	37,701	24,758,226	17,277,719	14,706	17,263,013	98.9	38.7	43.4
Materials.....	180,458,300	6,654,914	173,803,386	102,623,748	113,153	102,510,595	71,080,632	90,163	71,000,469	144.8	69.5	44.4
Miscellaneous.....	22,108,957	638,226	21,470,731	15,970,427	19,382	15,951,045	8,923,845	9,502	8,914,343	140.9	34.6	78.9
Value of products.....	279,852,346	10,293,548	269,558,798	168,111,658	212,630	167,899,028	113,430,772	135,284	113,295,488	137.9	60.6	48.2
Value added by manufacture.....	99,394,046	3,638,634	95,755,412	65,487,910	99,477	65,388,433	42,340,140	45,121	42,295,019	126.4	48.4	54.6

¹ A minus sign (-) denotes decrease. ² Figures in this column used in computing percentages of increase. ³ April 15, 1910. ⁴ State census, June 1, 1905. ⁵ June 1, 1900. ⁶ Figures not available.

The proportions of the population and manufactures in the outside territory as compared with the total metropolitan district are in general increasing, as is indicated by the percentages in Table 41. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904, and those for 1904 and 1899 upon the figures for the district exclusive of the territory deducted.

Table 41

	PER CENT TERRITORY OUTSIDE OF BUFFALO IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904 ²	1899 ³
Population.....	9.3	9.5	7.0
Number of establishments.....	5.7	4.8	4.7
Persons engaged in manufactures.....	14.3	10.3	(5)
Proprietors and firm members.....	4.3	3.9	(5)
Salariated employees.....	12.9	10.0	4.6
Wage earners (average number).....	14.7	10.6	8.7
Primary horsepower.....	60.2	57.7	(5)
Capital.....	28.8	27.2	8.8
Expenses.....	18.9	12.6	7.1
Services.....	15.7	12.5	8.6
Salaries.....	13.9	11.6	5.6
Wages.....	16.3	12.7	9.2
Materials.....	21.4	13.8	7.1
Miscellaneous.....	5.0	5.4	3.5
Value of products.....	18.8	12.2	6.8
Value added by manufacture.....	14.1	9.8	6.2

¹ Based on figures for district as constituted in 1909, exclusive of territory added since 1904. ² Based on figures for district as constituted in 1904, exclusive of territory deducted since 1904. ³ Figures not available.

The proportion of the population of the district that was reported from the territory outside of Buffalo increased from 7 per cent in 1900 to 9.3 per cent in

1910, and the proportion of the value of products of that district that was contributed by the outlying territory increased steadily from 6.8 per cent in 1899 to 18.8 per cent in 1909.

Leading industries.—Table 42 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

Among the 29 industries shown separately in the table there are 12 for which totals for the district can not be published, because to do so would disclose individual operations; and 7 which were not carried on in the part of the district which is outside the corporate limits of Buffalo. In all these cases the statistics shown are figures for Buffalo exclusively.

The most important industry as measured by value of products was the manufacture of iron and steel, which is included under "all other industries," to avoid disclosure of individual operations. Of the industries shown separately, slaughtering and meat packing ranked highest in value of products, with 9.1 per cent of the total reported for all industries in the district, closely followed by foundries and machine shops, with 8.4 per cent of this total, and flour mills and gristmills, with 7.3 per cent. Other important industries, arranged according to value of products, were the manufacture of automobiles, including bodies and parts, the lumber and soap industries, printing and publishing, and the malt and malt-liquor industries.

SUMMARY FOR THE BUFFALO METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaries and employees.	Wage earners (average number).								
All industries.....	1,364	75,086	1,638	8,878	63,572	322,280	\$280,052,887	\$11,190,444	\$36,172,559	\$180,458,300	\$22,108,967	\$279,852,348	\$99,394,046
Automobiles, including bodies and parts.....	23	3,640	13	583	3,044	4,561	9,300,037	283,056	2,199,667	4,595,655	1,102,677	9,597,763	6,002,108
Blacking and cleansing and polishing preparations.....	11	287	4	147	136	209	942,202	123,055	66,554	411,139	230,481	963,586	552,447
Boots and shoes, including cut stock and findings.....	14	722	14	55	653	370	909,755	55,264	267,136	834,868	63,903	1,355,821	520,953
Brass and bronze products.....	18	414	12	55	347	2,417	1,046,601	71,657	210,942	1,141,075	95,633	1,790,549	649,474
Bread and other bakery products.....	203	1,848	195	261	1,392	1,224	4,478,564	251,023	749,587	3,441,903	447,465	5,720,259	2,278,356
Carriages and wagons and materials..	55	535	56	29	450	574	1,010,649	44,500	258,832	571,805	60,641	1,237,668	665,863
Cars and general shop construction and repairs by steam-railroad companies.....	17	3,474	.....	284	3,190	2,768	2,390,773	218,679	1,938,340	2,276,958	94,771	4,524,448	2,247,490
Clothing, men's, including shirts.....	60	1,681	70	181	1,430	365	2,308,628	181,935	600,778	1,796,766	463,658	3,698,623	1,901,857
Clothing, women's.....	14	655	12	87	556	61	448,391	62,668	181,899	565,054	93,111	1,014,059	449,005
Confectionery.....	26	633	22	106	505	604	614,336	92,622	160,073	738,814	117,585	1,179,919	441,105
Cooperage and wooden goods, not elsewhere specified.....	13	194	12	10	172	206	305,536	11,682	94,126	428,078	22,413	608,941	180,863
Copper, tin, and sheet-iron products..	73	1,912	78	265	1,669	1,955	4,146,847	288,640	864,560	2,290,255	255,967	4,166,751	1,876,496
Electrical machinery, apparatus, and supplies.....	18	347	4	61	282	654	1,174,857	84,975	141,327	335,849	68,020	661,287	325,436
Flour-mill and gristmill products.....	19	842	10	325	607	11,473	6,510,380	339,786	342,145	17,825,995	934,453	20,358,557	2,532,562
Foundry and machine-shop products..	168	11,118	100	1,178	9,840	13,161	22,812,333	1,494,641	6,766,209	10,247,358	3,290,403	23,549,910	13,302,552
Furniture and refrigerators.....	33	2,347	25	270	2,052	2,846	4,083,497	311,618	1,036,648	2,155,903	304,191	4,184,964	2,029,061
Jewelry.....	14	401	22	81	298	116	1,307,483	99,059	173,650	385,255	77,813	679,250	593,995
Leather goods.....	22	609	27	73	609	460	937,585	96,134	262,168	520,546	85,463	1,129,321	608,775
Leather, tanned, curried, and finished..	4	579	7	59	513	1,297	3,058,110	85,065	246,027	2,193,954	133,536	2,808,993	615,039
Liquors, malt.....	16	828	.....	155	673	4,888	12,783,514	412,529	536,338	1,490,712	2,935,828	6,496,549	5,015,837
Lumber and timber products.....	58	3,047	49	287	2,711	11,029	6,383,495	295,421	1,452,301	6,402,776	503,273	9,321,233	2,918,457
Malt.....	16	362	8	66	288	3,862	16,471,572	144,429	221,795	5,656,794	357,141	7,094,746	1,437,962
Marble and stone work.....	21	427	20	33	374	460	782,556	38,681	252,154	450,317	111,812	884,873	534,556
Mattresses and spring beds.....	8	230	4	86	190	137	256,132	29,732	91,147	276,144	44,142	554,814	278,670
Patent medicines and compounds and druggists' preparations.....	67	618	50	316	252	374	1,161,646	216,608	102,118	438,922	1,419,153	2,953,515	2,514,593
Printing and publishing.....	176	4,103	142	791	3,170	3,036	6,842,971	807,256	1,973,911	2,399,934	1,217,709	7,842,910	5,442,976
Slaughtering and meat packing.....	39	1,929	36	232	1,662	3,743	7,270,613	329,310	963,210	21,788,626	307,906	25,416,054	3,627,428
Soap.....	8	1,592	2	230	1,360	2,489	7,256,506	214,556	544,592	5,760,070	548,499	8,652,900	2,892,830
Tobacco manufactures.....	204	798	227	38	533	21	630,258	33,523	281,233	563,155	178,187	1,273,222	710,067
All other industries.....	666	28,914	418	3,582	24,914	246,320	154,427,060	4,482,742	14,183,194	82,483,620	6,545,123	119,730,861	37,247,241

¹ Excluding statistics for establishments located outside of the corporate limits of Buffalo, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the leading industries as can be shown separately and had products of \$2,000,000 or more in 1909 are given in Table 43 for 1909, 1904, and 1899, respectively.

COMPARATIVE SUMMARY FOR THE BUFFALO METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES: 1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
										Number of establishments.			Wage earners (average number).			Value of products.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Slaughtering and meat packing.....	² 39	² 33	² 32	1,662	1,182	974	\$25,416,054	\$16,219,823	\$11,771,727	21.9	18.2	3.1	70.6	40.6	21.4	115.9	66.7	37.8
Foundry and machine-shop products	168	128	(*)	9,840	7,762	(*)	23,549,910	15,880,210	(*)	.....	31.2	.....	26.8	.....	.....	48.3	.....
Flour-mill and gristmill products.....	19	14	13	507	431	201	20,358,557	9,889,016	3,360,836	46.2	35.7	7.7	162.2	17.6	114.4	507.6	105.9	195.1
Automobiles, including bodies and parts.....	23	² 5	3	3,044	625	23	9,597,763	1,385,509	77,689	666.7	360.0	66.7	.....	387.0	.....	592.7	.....
Lumber and timber products.....	58	37	36	2,711	2,069	2,161	9,321,233	5,573,289	5,014,241	61.1	56.8	2.8	25.5	31.0	-4.3	85.9	67.2	11.1
Soap.....	8	10	9	1,360	1,140	743	8,652,900	4,792,915	3,818,571	-11.1	-20.0	11.1	83.0	19.3	53.4	126.6	80.5	25.5
Printing and publishing.....	176	170	138	3,170	2,887	2,404	7,842,910	6,479,549	4,045,460	27.5	3.5	23.2	31.9	9.8	20.1	93.9	21.0	60.2
Newspapers and periodicals.....	45	45	35	1,182	935	757	4,165,243	2,950,295	1,749,037	28.6	.....	28.6	56.1	26.4	23.5	138.1	41.2	68.7
Book and job.....	104	103	87	913	757	1,071	1,739,634	1,307,512	1,455,933	19.5	1.0	18.4	-14.8	20.6	-29.3	19.5	33.0	-10.2
All other printing and publishing industries ²	27	22	16	1,076	1,195	576	1,938,033	2,221,742	840,490	68.8	22.7	37.5	86.6	-10.0	107.5	130.6	-12.8	164.3
Malt.....	16	17	16	288	225	205	7,094,746	3,035,801	1,959,967	.....	-5.9	6.2	40.5	28.0	9.8	262.0	133.7	54.9
Liquors, malt.....	² 16	² 19	² 18	673	591	560	6,496,549	5,187,216	4,269,973	-11.1	-15.8	5.6	20.2	13.9	5.5	52.1	25.2	21.5
Bread and other bakery products.....	203	150	160	1,392	1,330	1,007	5,720,259	4,492,465	2,564,864	26.9	35.3	6.3	38.2	4.7	32.1	123.0	27.3	75.2
Clothing.....	74	102	134	1,986	2,143	1,885	4,712,682	4,877,942	3,216,368	-44.8	-27.5	-23.9	5.4	-7.3	13.7	46.5	-3.4	51.7
Men's, including shirts.....	² 60	91	124	1,430	1,777	1,627	3,698,623	4,369,341	2,943,117	-51.6	-34.1	-26.6	-12.1	-19.5	9.2	25.7	-15.4	48.5
Women's.....	² 14	11	10	556	366	258	1,014,059	508,601	273,249	40.0	27.3	10.0	115.5	51.9	41.9	271.1	99.4	86.1
Cars and general shop construction and repairs by steam-railroad companies.....	² 7	10	² 9	3,190	4,094	3,245	4,524,448	5,120,717	4,191,455	-22.2	-30.0	11.1	-1.7	-22.1	26.2	7.9	-11.6	22.2
Furniture and refrigerators.....	² 33	26	² 21	2,052	1,659	1,220	4,184,964	2,543,082	1,828,706	57.1	26.9	23.8	68.2	23.7	36.0	128.8	64.6	39.1
Copper, tin, and sheet-iron products..	73	40	² 27	1,569	1,479	354	4,166,751	2,555,076	828,720	170.4	82.5	48.1	343.2	6.1	317.8	402.8	63.1	208.3
Patent medicines and compounds and druggists' preparations.....	67	47	² 47	252	264	489	2,953,515	2,025,361	1,933,044	42.6	42.6	.....	-48.5	-4.5	-46.0	52.8	45.8	4.8
Leather, tanned, curried, and finished	4	4	3	513	686	561	2,808,993	2,428,392	1,663,350	33.3	.....	33.3	-8.6	-25.2	22.3	68.9	15.7	46.0

¹ A minus sign (-) denotes decrease. Percentage not shown where base is less than 100 for wage earners, or less than \$100,000 for value of products.
² Excluding statistics for one establishment, to avoid disclosure of individual operations.
³ Excluding statistics for two establishments, to avoid disclosure of individual operations.
⁴ Comparable figures not available.
⁵ Includes "bookbinding and blank-book making;" "engraving, steel and copper plate, including plate printing;" and "lithographing;" and for 1909 and 1904 "printing and publishing, music."

The greatest absolute increase in value of products during the decade in the area under consideration, \$17,007,721, or 507.6 per cent, is shown for flour mills and gristmills, and the next greatest relative increase is in copper, tin, and sheet-iron products.

Of the industries shown in the comparative table, only two—lumber and timber products and foundry and machine-shop products—are greatly affected by the inclusion of statistics for manufactures in territory added to the district since 1904.

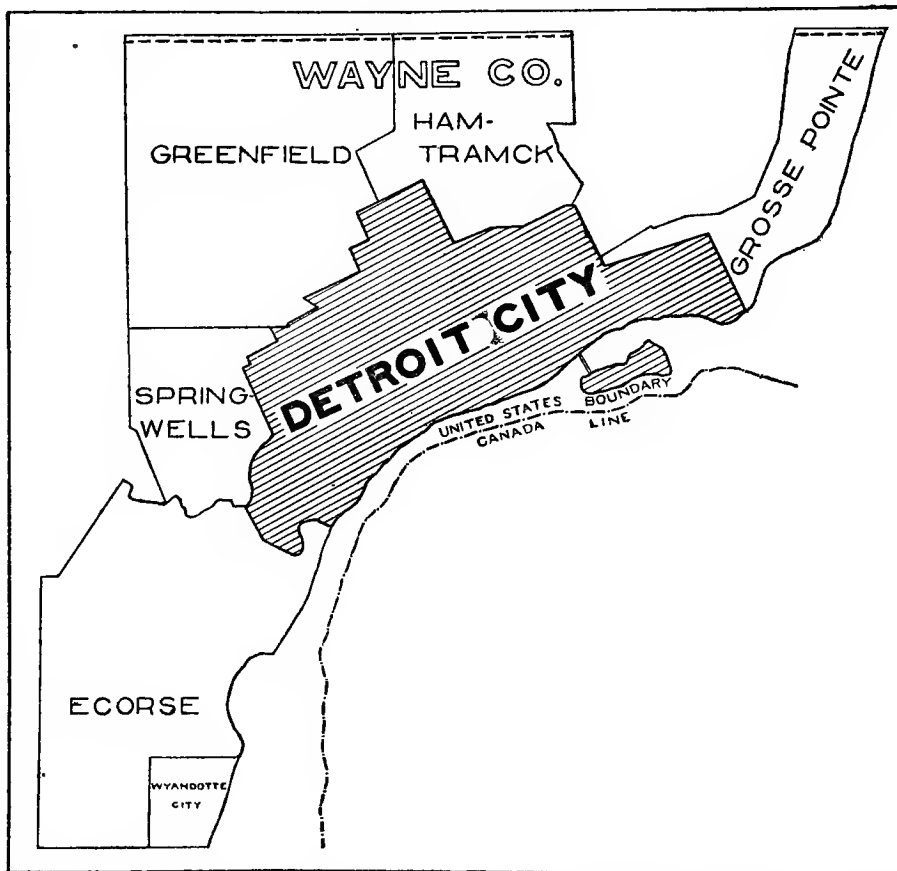
DETROIT METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Detroit embraces 96,554 acres, of which 26,103 acres comprise the area of Detroit and 70,451 acres the area of the outside territory. The population of the city of Detroit proper in 1910 was 465,766 and that of the outlying territory 35,216, the total for the district being 500,982. In addition to the city of Detroit the district includes Wyandotte city and the townships of Ecorse, Greenfield, Grosse Pointe, Hamtramck, and Springwells, all of which are in Wayne County. Owing to the fact that adjacent territory in Canada, including the thriving municipalities of Windsor and Walkerville, is industrially to a large extent tributary to

Detroit, the statistics for the district do not adequately represent the area closely associated with the development of Detroit. A tendency on the part of the city to enlarge its area in conformity with the metropolitan development seems to be indicated by its recent acquisitions of territory, namely, part of Greenfield township (288 acres) added in 1905; part of Springwells township (4,416 acres), including Delray village, added in 1906; and parts of Grosse Pointe, Greenfield, and Hamtramck townships (3,255 acres) added in 1907.

The following is an outline map of the district showing the various cities and townships included:

DETROIT METROPOLITAN DISTRICT: 1909.



Detroit was first settled in 1701 by the French, in whose possession it remained until surrendered to the British in 1760. In 1796 it became territory of the United States. It was incorporated as a town in 1802 and as a city in 1815. Detroit was the seat of government of Michigan territory until 1837, when the territory

became a state, and was capital of the state until 1847. The progress of the city commercially, industrially, and in other respects, particularly during the decade 1899–1909, has been very marked. While Detroit has many industrial advantages, perhaps the most important is its geographical position with reference

to the Great Lakes, the city being situated on the Detroit River, the channel of communication between the upper and lower lakes.

Summary for the district.—Table 44 is a summary of the statistics of manufacturing industries in 1909, with a statement of the population in 1910, for the Detroit metropolitan district, for the city of Detroit, and for the territory outside Detroit, the percentage which the figure for Detroit represents of the total for the district being shown in the case of each item.

The percentages which the figures for the central city represent of the total for the metropolitan district are much larger than in the case of most of the other metropolitan districts discussed in this report. It should be borne in mind in this connection that certain Canadian municipalities are closely associated with the city commercially and industrially. The percentages representing the contribution of Detroit to the totals for the district are remarkable for their small degree of variation, being over 90 in the case of every item except primary horsepower, for which the figure is 83.7.

	NUMBER OR AMOUNT.			Per cent Detroit is of total for district.
	The district.	Detroit.	District exclusive of Detroit.	
Population ¹	500,982	465,766	35,216	93.0
Number of establishments.....	2,104	2,036	68	96.8
Persons engaged in manufacture.....	101,482	95,841	5,641	94.4
Proprietors and firm members.....	1,865	1,804	61	96.7
Salaried employes.....	13,596	13,026	570	95.8
Wage earners (average number).....	86,021	81,011	5,010	94.2
Primary horsepower.....	136,460	114,190	22,270	83.7
Capital.....	\$210,401,992	\$190,028,928	\$20,373,064	90.4
Expenses.....	\$228,207,916	\$215,227,611	\$12,980,305	94.3
Services.....	62,037,838	58,266,672	3,771,166	93.9
Salaries.....	16,028,377	15,259,770	768,607	95.2
Wages.....	46,009,461	43,006,902	3,002,559	93.5
Materials.....	137,848,079	130,217,541	7,630,538	94.5
Miscellaneous.....	28,321,999	26,743,398	1,578,601	94.4
Value of products.....	268,899,761	252,992,123	15,907,638	94.1
Value added by manufacture.....	131,051,682	122,774,582	8,277,100	93.7

¹ April 15, 1910.

Leading industries.—Table 45 gives the statistics for the district for 1909, by industries, separate figures being shown for industries having products valued at \$500,000 or over, except where such figures would disclose the operations of individual concerns.

SUMMARY FOR THE DETROIT METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employes.	Wage earners (average number).								
All industries.....	2,104	101,482	1,865	13,586	86,021	136,460	\$210,401,992	\$18,028,377	\$46,009,451	\$137,849,079	\$28,321,999	\$268,899,761	\$131,051,682
Automobiles, including bodies and parts.....	168	17,437	.....	1,762	15,675	14,666	28,927,610	1,781,089	9,620,799	31,362,816	4,031,212	59,536,154	28,173,338
Boots and shoes, including cut stock and findings.....	8	1,453	6	120	1,327	262	1,581,616	159,878	490,659	1,701,978	192,048	2,743,913	1,041,935
Brass and bronze products.....	37	4,374	16	326	4,032	10,651	7,306,220	460,889	2,048,987	8,272,612	547,573	12,297,331	4,024,719
Bread and other bakery products.....	274	1,624	281	226	1,117	1,118	2,023,613	219,683	643,737	2,920,029	326,084	4,869,289	1,409,260
Brick and tile.....	18	545	24	19	502	1,879	765,261	25,757	311,796	203,224	53,005	794,132	590,908
Canning and preserving.....	9	496	6	82	408	549	1,275,792	99,309	166,923	854,966	69,208	1,568,254	713,288
Carriages and wagons and materials.....	134	321	44	14	263	188	654,849	26,630	164,230	189,026	22,711	506,648	317,622
Clothing, men's, including shirts.....	22	3,008	27	195	2,786	951	2,472,588	249,973	963,231	2,351,801	539,856	4,760,846	2,409,045
Clothing, women's.....	27	1,041	29	91	921	154	825,433	81,971	357,317	661,199	141,525	1,493,831	832,632
Coffee and spice, roasting and grinding.....	6	68	1	26	41	186	220,585	30,724	23,856	452,075	31,610	616,503	184,428
Confectionery.....	23	501	30	84	387	341	374,491	68,813	138,886	629,377	145,577	1,136,465	507,088
Copper, tin, and sheet-iron products.....	72	2,162	74	146	1,932	1,453	3,890,125	158,324	850,687	1,932,126	221,820	3,534,425	1,602,299
Electrical machinery, apparatus, and supplies.....	23	685	15	129	541	575	1,055,892	144,529	225,745	493,221	193,391	1,147,922	654,701
Flour-mill and gristmill products.....	15	220	5	46	169	1,150	1,431,775	64,880	78,060	4,422,024	256,133	5,089,114	667,090
Foundry and machine-shop products.....	1215	10,212	126	1,393	8,694	10,336	20,434,102	1,412,656	4,827,966	7,614,067	2,549,920	18,296,033	10,681,966
Fur goods.....	119	519	24	124	371	24	884,029	112,471	180,850	706,846	186,363	1,737,783	1,030,937
Furniture and refrigerators.....	133	2,528	28	210	2,290	3,722	3,203,273	256,688	1,186,158	1,301,810	610,804	3,761,834	2,460,024
Gas and electric fixtures and lamps and reflectors.....	11	243	9	34	200	202	345,674	37,651	114,236	324,098	71,799	612,465	288,367
Hosiery and knit goods.....	9	367	7	26	334	214	423,975	25,426	91,249	325,787	25,501	559,398	233,611
Iron and steel, steel works and rolling mills.....	5	1,064	.....	75	989	3,430	1,969,480	114,316	558,871	1,316,652	168,877	2,297,048	990,396
Leather goods.....	122	516	18	95	403	530	821,356	84,632	210,576	818,508	86,976	1,396,320	577,812
Liquors, malt.....	118	838	13	179	646	3,886	5,208,290	249,952	494,702	1,184,890	1,772,265	4,942,213	3,757,323
Looking-glass and picture frames.....	12	367	15	25	327	265	406,111	40,666	156,051	222,193	68,820	567,910	345,717
Lumber and timber products.....	63	2,658	56	244	2,358	5,724	5,309,164	264,769	1,157,914	4,320,849	306,977	6,899,666	2,578,817
Paint and varnish.....	12	724	11	355	358	1,304	3,177,728	497,405	233,709	2,241,498	702,171	4,201,252	1,959,754
Patent medicines and compounds and druggists' preparations.....	74	4,289	54	1,417	2,818	1,819	10,179,080	1,853,467	1,328,477	4,303,728	2,366,760	11,558,419	7,254,691
Printing and publishing.....	228	4,068	216	1,327	2,525	2,609	4,180,514	1,165,913	1,572,047	2,046,914	1,315,719	7,302,872	5,255,958
Shipbuilding, including boat building.....	17	607	22	100	485	1,079	1,611,177	77,173	308,726	511,909	144,554	1,101,635	589,726
Slaughtering and meat packing.....	29	983	33	139	811	3,092	3,340,183	138,182	432,996	11,220,715	306,960	12,849,574	1,628,859
Stoves and furnaces, including gas and oil stoves.....	8	3,130	.....	322	2,808	2,741	6,238,684	480,823	1,809,363	1,570,276	1,008,834	5,676,418	4,106,142
Tobacco manufactures.....	203	6,550	207	459	5,884	925	5,488,671	638,216	2,177,068	5,871,500	3,174,103	12,779,032	6,907,532
All other industries.....	500	27,894	469	3,806	23,619	60,335	84,376,251	5,005,623	13,093,589	35,499,365	6,682,843	72,285,062	36,765,697

¹ Excluding statistics for establishments located outside of the corporate limits of Detroit, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Among the 31 industries shown separately in the table are 9 for which the totals for the district can not be published, because to do so would disclose individual operations; and 17 which were not carried on in the part of the district which is outside the corporate limits of Detroit. In all these cases the statistics shown are figures for Detroit exclusively.

By far the most important industry in Detroit is the manufacture of automobiles, including bodies and parts. The figures given for this industry in the table do not include statistics for one establishment located outside the city limits. The 68 establishments engaged in this industry in Detroit reported 22.1 per cent of the value of products for all industries in the metropolitan district. Aside from the omission of the establishment located outside the limits of

Detroit, the statistics given for the industry do not adequately represent the importance of the industry in the district, owing to the fact that many establishments engaged in the manufacture of brass and bronze products and foundry and machine-shop products, which are also leading industries in the district, turn out automobile accessories and manufacture and repair automobile engines and parts.

Other important industries, arranged according to the value of products, were slaughtering and meat packing, the manufacture of tobacco products and of patent medicines and compounds, printing and publishing, and the lumber industry. The manufacture of chemicals, an industry for which separate statistics can not be published without disclosing individual operations, is also of considerable importance.

CINCINNATI METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Cincinnati embraces 111,772 acres of territory, of which 31,893 acres constitute the area of Cincinnati and 79,878 acres the area of the outside territory. The population of the city of Cincinnati proper in 1910 was 363,591, and that of the outside territory, 200,213, the total for the district being 563,804.

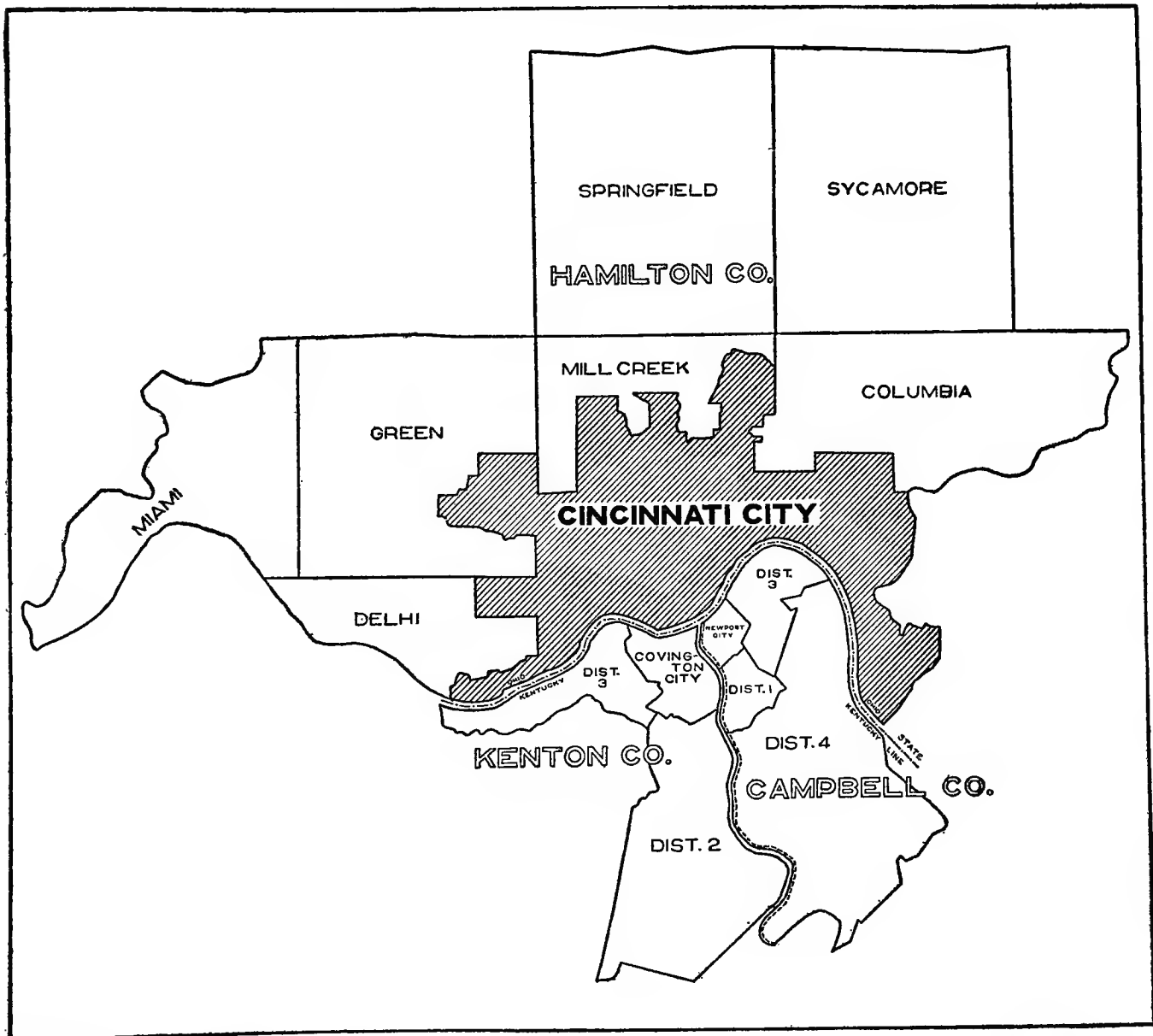
As defined at the census of 1910, the metropolitan district comprised, in addition to the central city, seven townships in Hamilton County, Ohio—Columbia, Delhi, Green, Miami, Millcreek, Springfield, and Sycamore—and seven magisterial districts in Kentucky—the first, second, third, and fourth in Campbell County, and the first, second, and third in Kenton County.

The incorporated places of over 10,000 inhabitants within the district, besides Cincinnati, are Norwood city, Ohio, which is included in Columbia and Millcreek townships; Newport city, Ky., which comprises district 2 and part of district 1 in Campbell County; and Covington city, Ky., which comprises district 1 and part of districts 2 and 3 of Kenton County.

The report for 1904 included all the cities named and all the townships except Miami, Springfield, and Sycamore. In 1907 a part of Millcreek township was annexed to Cincinnati, and in 1909 Spencer and parts of Anderson and Delhi townships were added to the city.

The following is an outline map of the metropolitan district as constituted in 1909, showing the various cities, townships, and magisterial districts included:

CINCINNATI METROPOLITAN DISTRICT: 1909.



Summary for the district.—Table 46 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the Cincinnati metropolitan district; for Cincinnati and Norwood cities in Ohio, and Covington and Newport

cities in Kentucky, and for the territory outside these cities which is included in the metropolitan district. The percentage which the figure for Cincinnati represents of the total for the district is shown in the case of each item.

Table 46	NUMBER OR AMOUNT.							Per cent Cincinnati of total for district.
	The district.	Cincinnati.	District exclusive of Cincinnati.					
			Total.	Covington.	Newport.	Norwood.	Remainder.	
Population ¹	563,804	363,591	200,213	53,270	30,309	16,185	100,449	64.5
Number of establishments.....	2,827	2,184	643	196	144	49	254	77.3
Persons engaged in manufactures.....	95,571	72,488	23,083	4,528	2,995	4,445	11,115	75.8
Proprietors and firm members.....	2,593	2,015	678	189	146	31	212	77.7
Salaried employees.....	12,646	10,281	2,365	397	217	507	1,244	81.3
Wage earners (average number).....	80,332	60,192	20,140	3,942	2,632	3,907	9,659	74.9
Primary horsepower.....	140,254	88,597	51,657	8,256	3,750	6,381	23,270	63.2
Capital.....	\$212,555,469	\$150,254,292	\$62,301,177	\$6,633,612	\$4,568,332	\$13,367,715	\$37,731,518	70.7
Expenses.....	233,538,340	174,788,679	58,749,661	8,011,897	5,858,015	8,534,513	36,345,236	74.8
Services.....	57,337,552	43,860,281	13,477,271	2,265,391	1,618,096	2,712,079	6,881,705	76.2
Salaries.....	15,601,542	12,759,309	2,842,233	427,176	277,465	631,512	1,506,080	81.8
Wages.....	41,736,010	31,100,972	10,635,038	1,838,215	1,340,631	2,080,567	5,375,625	74.8
Materials.....	139,107,061	101,931,950	37,176,111	4,470,939	3,266,278	4,020,773	25,317,121	73.2
Miscellaneous.....	37,093,727	28,996,448	8,097,279	1,275,567	873,641	1,801,661	4,146,410	78.2
Value of products.....	260,399,619	194,515,692	65,883,927	8,711,929	6,490,596	9,684,332	40,997,070	74.7
Value added by manufacture.....	121,292,558	92,583,742	28,708,816	4,240,990	3,124,318	5,663,559	15,679,949	76.3

¹ April 15, 1910.

In 1909 the Cincinnati metropolitan district had 2,827 manufacturing establishments, which gave employment to an average of 95,571 persons during the year, and paid out \$57,337,552 in salaries and wages. Of the persons employed, 80,332 were wage earners. These establishments turned out products to the value of \$260,399,619, to produce which materials costing \$139,107,061 were utilized. The value added by manufacture was thus \$121,292,558. The Cincinnati district ranked tenth in 1909 among the metropolitan districts of the United States in the value of its manufactured products.

In the Cincinnati district, as in all the districts except Pittsburgh and Boston, the greater part of the value of the manufactured products of the district was reported by factories within the central city. Cincinnati contained nearly two-thirds (64.5 per cent) of the population of the district of which it is the manufacturing, commercial, and financial center, and contributed about three-fourths (74.7 per cent) of the value of products. Its manufacturing establishments constituted nearly eight-tenths (77.3 per cent) of all in the district and gave employment to approximately three-fourths of the wage earners (74.9 per cent).

Of the places outside Cincinnati for which statistics are given separately Norwood had the largest value of products, representing 3.7 per cent of the total for the metropolitan district; and it contained 5.4 per cent of the total population. The average value of manufactured products per establishment for this city was larger than for any other city shown, not excepting Cincinnati.

The group of seven townships or parts of townships, and of five magisterial districts or parts of districts, outside of incorporated places having a population of more than 10,000 had a combined population equal to 17.8 per cent of the total for the district, and contributed 15.7 per cent of the value of its products.

The principal industries of Cincinnati in 1909, as measured by value of products, were slaughtering and meat packing, foundries and machine shops, and the manufacture of men's clothing. Those of Norwood were printing and publishing, and the manufacture of paper goods (playing cards and games), furniture, and foundry and machine-shop products. During the decade this city increased in population from 6,480 to 16,185. The leading industries in Covington were foundries and machine shops and the manufacture of chewing and smoking tobacco; and in Newport, steel works and rolling mills and breweries. The most important places from a manufacturing standpoint outside of these cities were Ivorydale, with its large soap works; Lockland village, with the manufacture of roofing materials and mattresses and spring beds; and St. Bernard, with the manufacture of soap.

Comparison with earlier censuses.—Table 47 is a comparative summary of the statistics for the district as a whole for 1909, 1904, and 1899, together with the percentages of increase from census to census. For the purposes of comparison with the statistics for the district as given for 1904¹ and 1899,¹ the totals for 1909 are segregated into figures for the territory added since 1904, and into those for the remainder of the district

¹ Bureau of Census: Industrial Districts, 1905, p. 54.

Table 47

	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹		
	1909			1904	1899	1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ²					
Population.....	563,804	29,229	534,575	(⁴)	473,282	13.0		
Number of establishments.....	2,827	85	2,742	2,600	2,973	-7.8	5.5	-12.5
Persons engaged in manufactures.....	95,571	3,184	92,387	85,147	(⁵)		8.5	
Proprietors and firm members.....	2,593	73	2,520	2,587	(⁵)		-2.6	
Salaried employees.....	12,646	278	12,368	9,825	6,819	81.4	25.9	44.1
Wage earners (average number).....	80,332	2,833	77,499	72,735	64,409	20.3	6.5	12.9
Primary horsepower.....	140,254	9,399	130,855	91,798	(⁵)		42.5	
Capital.....	\$212,555,469	\$6,058,352	\$206,497,117	\$170,769,228	\$121,972,067	69.3	20.9	40.0
Expenses.....	233,538,340	8,606,054	224,932,286	180,967,427	141,787,041	58.7	24.3	27.7
Services.....	57,337,552	1,898,767	55,438,785	44,862,069	34,161,990	62.3	23.6	31.4
Salaries.....	15,601,542	400,277	15,201,265	10,929,512	7,170,888	112.0	39.1	52.4
Wages.....	41,736,010	1,498,480	40,237,530	33,932,557	26,981,122	49.1	18.6	25.8
Materials.....	139,107,061	6,040,873	133,066,188	102,721,628	82,263,028	61.8	29.5	24.9
Miscellaneous.....	37,093,727	666,424	36,427,303	33,383,730	25,352,023	43.7	9.1	31.7
Value of products.....	260,399,619	9,324,048	251,075,571	203,095,605	164,217,216	52.9	23.6	23.7
Value added by manufacture.....	121,292,558	3,283,175	118,009,383	100,373,977	81,954,188	44.0	17.6	22.5

¹ A minus sign (-) denotes decrease.

² Figures in this column used in computing percentages of increase.

³ April 15, 1910.

⁴ No population census in 1905.

⁵ June 1, 1900.

⁶ Figures not available.

In all items shown, except number of establishments and cost of materials, the percentage of increase was greater during the earlier five-year period, 1899-1904, than during the period 1904-1909. During the decade as a whole the rate of increase was much greater in number of salaried employees and salaries than for any other items. The average number of wage earners increased only 20.3 per cent during this period, but the wages increased 49.1 per cent, a rate of gain approximately equal to that in value of products (52.9 per cent). The increase in primary horsepower of all kinds from 1904 to 1909 was 42.5 per cent. Statistics as to the primary power used in 1899 are not available.

The proportion of population and manufactures in the outside territory of the district as compared with the total for the city of Cincinnati is, in general, increasing, as indicated by the percentages in Table 48. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904.

Table 48

	PER CENT TERRITORY OUTSIDE OF CINCINNATI IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904	1899
Population.....	32.0	(²)	31.1
Number of establishments.....	20.4	16.5	17.5
Persons engaged in manufactures.....	21.5	19.0	(³)
Proprietors and firm members.....	20.0	15.7	(³)
Salaried employees.....	16.9	16.6	9.6
Wage earners (average number).....	22.3	19.5	14.7
Primary horsepower.....	32.3	27.0	(³)
Capital.....	27.2	23.7	15.2
Expenses.....	22.3	18.9	13.9
Services.....	20.9	18.7	13.5
Salaries.....	18.1	16.9	10.2
Wages.....	22.7	19.3	14.4
Materials.....	23.4	18.9	13.2
Miscellaneous.....	20.4	18.9	16.5
Value of products.....	22.5	18.2	13.7
Value added by manufacture.....	21.5	17.5	14.2

¹ Based on figures for district as constituted in 1904 and 1899.

² No population census in 1905.

³ Figures not available.

The proportion of the population of the district, as originally constituted, that was reported from the

territory outside of Cincinnati, increased from 31.1 per cent in 1900 to 32 per cent in 1910, and the proportion of the value of products of that district that was contributed by the outlying territory increased steadily from 13.7 per cent in 1899 to 18.2 per cent in 1904 and 22.5 per cent in 1909.

Leading industries.—Table 49 gives the statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

Among the 45 industries shown separately in the table there are 14 for which totals for the district can not be published, because to do so would disclose the operations of individual establishments, and 8 which were not carried on in the part of the district which is outside the corporate limits of Cincinnati. In all these cases the statistics shown are figures for Cincinnati exclusively.

The manufacture of soap is a very prominent industry in the district, but it is not shown separately because only the comparatively small part of it reported from the city of Cincinnati can be given without disclosure of the operations of individual establishments.

The manufacture of foundry and machine-shop products was the leading industry in the Cincinnati district, the value of the products amounting to 10.1 per cent of the value of the products for all industries. There were two other industries having also a considerable proportion of the total—slaughtering and meat packing, with 7.7 per cent, and men's clothing, including shirts, with 6.8 per cent. Printing and publishing and the manufacture of malt liquors, carriages and wagons and materials, and lumber and timber products were also prominent.

Important industries for which complete figures can not be given without disclosing the operations of individual concerns are, in the order of their importance, liquors, distilled, and electrical machinery, apparatus, and supplies.

SUMMARY FOR THE CINCINNATI METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All industries	2,827	95,571	2,583	12,646	80,332	140,254	\$212,555,469	\$15,601,542	\$41,736,010	\$138,107,061	\$37,092,727	\$260,399,619	\$121,292,558
Bags, paper.....	5	358	.....	59	290	320	673,221	72,156	129,254	729,570	88,965	1,088,250	358,680
Boots and shoes, including cut stock and findings.....	132	8,702	21	692	7,989	4,631	7,856,352	1,015,788	3,517,986	8,583,670	1,091,444	14,998,672	6,415,002
Boxes, fancy and paper.....	15	738	9	60	669	218	442,245	69,947	184,858	291,704	56,734	679,170	387,466
Brass and bronze products.....	16	650	14	62	574	444	1,319,651	81,369	336,079	443,067	72,208	1,069,245	626,176
Bread and other bakery products.....	264	2,017	288	252	1,497	955	2,865,239	240,612	817,761	3,395,179	467,103	5,691,232	2,296,053
Canning and preserving.....	19	316	6	93	217	420	646,176	104,583	77,465	482,894	114,346	825,010	342,116
Carriages and wagons and materials.....	99	3,370	86	433	2,851	3,325	6,020,606	455,415	1,621,880	4,367,976	793,276	8,157,665	3,789,689
Cars and general shop construction and repairs by steam-railroad companies.....	7	1,747	.....	63	1,679	1,590	1,651,864	60,896	1,039,010	797,824	71,284	1,969,014	1,171,190
Chemicals.....	111	162	4	36	122	508	712,874	63,250	76,268	474,291	110,802	898,729	424,438
Clothing, men's, including shirts.....	301	8,492	371	1,001	7,120	776	10,421,295	1,211,737	2,971,422	8,709,625	2,978,071	17,646,324	8,936,799
Clothing, women's.....	26	1,541	41	175	1,325	776	1,229,602	216,923	618,775	1,513,764	298,714	2,912,862	1,399,098
Coffee and spice, roasting and grinding.....	18	356	7	128	221	691	1,083,406	130,513	91,271	1,595,209	148,571	2,110,024	514,815
Confectionery.....	122	922	21	130	771	573	970,132	138,741	279,006	1,221,923	181,436	2,029,075	807,152
Cooperage and wooden goods, not elsewhere specified.....	20	697	17	46	632	1,269	1,445,850	75,438	291,804	765,016	85,888	1,232,289	466,273
Copper, tin, and sheet-iron products.....	65	1,390	61	203	1,126	1,409	2,652,111	203,115	548,651	2,969,153	286,921	4,470,093	1,500,940
Cordage and twine and jute and linen goods.....	3	669	2	21	546	975	874,617	25,596	160,561	534,344	57,032	803,912	269,568
Electrical machinery, apparatus, and supplies.....	113	393	9	71	313	397	529,186	95,364	200,215	333,495	33,472	835,500	502,006
Fertilizers.....	5	442	.....	96	346	1,314	1,551,162	70,217	156,346	1,003,766	213,652	1,676,679	671,913
Flags, banners, regalia, society badges, and emblems.....	8	498	3	92	403	317	668,178	88,122	162,418	603,151	91,803	888,361	385,210
Flour-mill and gristmill products.....	11	124	8	38	78	1,062	570,850	42,339	63,614	1,432,174	49,407	1,635,493	203,319
Foundry and machine-shop products.....	238	13,716	130	1,880	11,706	18,372	29,542,095	2,378,730	6,793,105	11,127,047	3,165,929	26,186,468	15,059,421
Furnishing goods, men's.....	10	302	13	45	244	14	283,746	50,618	76,599	509,649	62,662	760,348	250,699
Furniture and refrigerators.....	63	3,059	68	237	2,754	5,079	4,953,600	291,900	1,422,175	2,338,774	748,992	5,646,080	3,307,306
Hats and caps, other than felt, straw, and wool.....	112	323	20	43	260	33	263,776	44,842	112,280	283,528	29,508	532,325	248,797
Ice, manufactured.....	15	243	6	58	180	4,471	2,343,548	73,093	115,427	161,161	110,508	567,814	406,653
Ink, printing.....	7	273	.....	92	181	1,417	1,545,929	189,286	129,855	794,337	459,361	1,884,894	1,090,557
Jewelry.....	115	284	25	49	210	88	1,002,184	62,464	156,398	517,559	69,717	935,935	418,376
Leather goods.....	19	664	23	106	635	252	1,500,970	100,886	278,188	799,653	135,783	1,618,778	719,125
Leather, tanned, curried, and finished.....	113	1,043	10	36	997	2,269	9,603,170	71,187	570,074	3,677,263	207,483	6,058,920	1,381,657
Liquors, distilled.....	14	300	.....	29	271	1,750	2,833,836	62,549	178,395	1,824,464	6,333,076	8,744,761	6,920,297
Liquors, malt.....	28	2,371	.....	389	1,982	13,591	17,929,034	790,475	1,400,039	2,656,167	4,304,883	11,016,171	8,360,004
Lumber and timber products.....	80	2,809	66	330	2,413	9,318	8,398,850	412,386	1,306,785	4,345,585	553,179	7,401,558	3,055,973
Marble and stone work.....	39	396	47	43	306	1,012	639,390	50,846	208,649	290,104	91,138	731,691	441,587
Millinery and lace goods.....	11	494	10	56	428	59	136,088	48,828	120,381	294,157	29,545	546,648	252,491
Musical instruments, pianos and organs and materials.....	17	760	5	43	712	835	1,184,890	61,919	371,324	1,080,430	113,361	1,752,617	672,187
Oil, not elsewhere specified.....	4	111	2	45	64	152	524,279	47,695	40,541	461,286	80,954	672,682	211,396
Paint and varnish.....	124	636	19	209	408	1,356	4,026,491	282,229	214,994	2,485,801	324,074	3,879,810	1,394,009
Patent medicines and compounds and druggists' preparations.....	55	542	43	218	281	424	1,004,884	206,275	114,279	516,796	250,209	1,293,009	776,213
Printing and publishing.....	318	6,806	281	1,525	5,000	6,058	13,183,475	1,638,634	3,236,020	4,220,558	2,828,940	13,998,611	9,778,053
Safes and vaults.....	16	703	1	123	579	970	1,156,228	256,800	358,838	629,840	84,376	1,401,157	771,317
Signs and advertising novelties.....	6	357	2	66	289	275	798,835	62,096	130,791	329,528	279,837	938,868	609,340
Slaughtering and meat packing.....	61	1,400	78	183	1,139	3,745	4,701,132	204,899	683,196	17,497,119	466,588	19,922,613	2,426,494
Stoves and furnaces, including gas and oil stoves.....	115	1,082	3	217	872	1,086	2,150,012	209,126	485,300	1,013,055	368,058	2,324,960	1,311,895
Tobacco manufactures.....	300	3,462	321	243	2,898	634	3,009,283	257,593	1,126,640	2,421,365	1,262,330	5,496,839	3,075,474
Wood, turned and carved.....	10	317	7	36	274	837	739,996	64,857	138,113	315,324	51,936	870,093	554,769
All other industries.....	530	19,625	467	2,587	16,571	44,787	55,221,433	3,229,210	8,633,080	38,367,816	7,340,171	64,690,380	26,331,564

¹Excluding statistics for establishments located outside of the corporate limits of Cincinnati, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and had a value of products amounting to \$2,000,000 or more in 1909 are given in Table 50 for 1909, 1904, and 1899.

COMPARATIVE SUMMARY FOR THE CINCINNATI METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES: 1909, 1904, AND 1899.

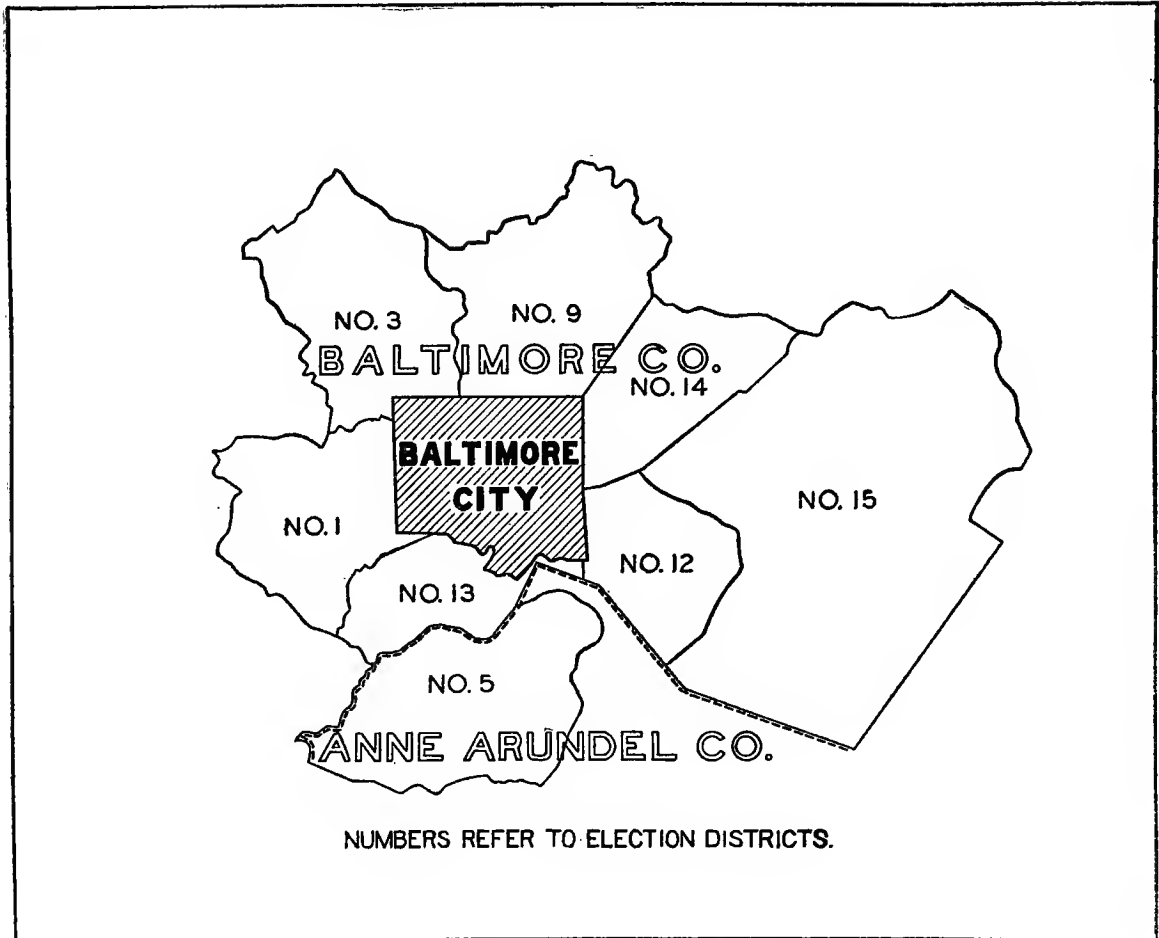
INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹									
										Number of establishments.			Wage earners (average number).			Value of products.			
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	
Foundry and machine-shop products.	238	206	(*)	11,706	9,588	(*)	\$26,186,468	\$18,793,155	(*)	.....	15.6	.....	.....	22.1	.....	.....	.....	39.3	.....
Liquors, malt, distilled, and vinous..	37	38	39	2,302	2,086	1,757	22,152,542	21,771,153	\$19,210,452	-5.1	-2.6	-2.6	31.0	10.4	18.7	15.3	1.8	13.3	.....
Clothing.....	327	356	580	8,445	6,590	6,829	20,559,186	17,866,150	14,991,077	-43.6	-8.1	-38.6	23.7	28.1	-3.5	37.1	15.1	19.2	.....
Man's, including shirts.....	301	327	639	7,120	5,419	5,439	17,646,324	15,154,336	12,905,093	-44.2	-8.0	-39.3	30.9	31.4	-0.4	38.7	18.4	17.4	.....
Women's.....	26	29	41	1,325	1,171	1,390	2,912,862	2,711,815	2,085,984	-36.6	-10.3	-29.3	-4.7	13.2	-15.8	39.6	7.4	30.0	.....
Slaughtering and meat packing.....	61	* 48	* 33	1,139	878	882	19,922,613	13,509,702	10,783,241	84.8	27.1	45.5	29.1	29.7	-0.5	84.8	47.6	25.3	.....
Boots and shoes, including cut stock and findings.....	* 32	* 35	49	7,989	6,644	6,786	14,998,672	11,152,013	8,668,117	-34.7	-8.6	-28.6	17.7	20.2	-2.1	73.0	34.6	28.7	.....
Printing and publishing.....	318	283	260	5,000	4,420	4,047	13,998,611	11,163,285	8,455,346	22.3	12.4	8.8	23.5	13.1	9.2	65.6	25.4	32.0	.....
Newspapers and periodicals.....	105	102	85	947	838	1,076	5,462,314	4,418,781	3,594,243	23.5	2.9	20.0	-12.0	13.0	-22.1	52.0	23.6	22.9	.....
Book and job.....	167	148	123	2,232	2,072	1,641	4,841,676	3,856,413	2,545,828	35.8	12.8	20.3	37.2	8.7	26.3	90.2	25.6	61.5	.....
Music.....	8	6	7	62	57	51	324,612	193,528	266,985	14.3	33.3	-14.3	.....	.....	.....	21.6	67.7	-27.5	.....
All other printing and publishing industries *.....	38	27	45	1,749	1,453	1,279	3,370,109	2,694,563	2,048,290	15.6	40.7	-40.0	36.7	20.3	13.6	64.5	25.1	31.6	.....
Carriages and wagons and materials.	99	92	91	2,851	3,244	3,310	8,157,665	8,799,029	8,050,291	8.8	7.6	1.1	-13.9	-12.1	-2.0	1.3	-7.3	9.3	.....
Lumber and timber products.....	80	65	54	2,413	2,154	1,705	7,401,658	6,507,172	4,663,369	48.1	23.1	20.4	41.5	12.0	26.3	68.7	13.7	39.6	.....
Bread and other bakery products.....	264	237	314	1,497	1,440	1,199	6,691,232	4,231,455	3,309,397	-15.9	11.4	-24.5	24.9	4.0	20.1	72.0	34.6	27.9	.....
Furniture and refrigerators.....	63	69	* 54	2,754	3,645	2,355	6,646,080	6,377,756	3,594,196	18.7	-8.7	27.8	16.9	-24.4	54.8	57.1	-11.5	77.4	.....
Tobacco manufactures.....	300	325	373	2,898	3,834	4,188	5,496,839	6,721,170	7,657,562	-19.6	-7.7	-12.9	-30.8	-24.4	-8.5	-28.2	-18.2	-12.2	.....
Cigars and cigarettes.....	286	313	357	2,541	3,402	3,737	3,879,701	4,607,195	4,973,865	-19.9	-8.6	-12.3	-32.0	-25.3	-9.0	-22.0	-16.8	-7.4	.....
Chewing and smoking tobacco and snuff.....	14	12	16	357	432	451	1,617,138	2,113,975	2,683,697	-12.5	16.7	-25.0	-20.8	-17.4	-4.2	-39.7	-23.5	-21.2	.....
Leather, tanned, curried, and finished.....	* 13	10	16	997	976	958	5,058,920	3,404,866	3,503,225	-18.8	30.0	-37.5	4.1	2.2	1.9	44.4	48.6	-2.8	.....
Copper, tin, and sheet-iron products.....	65	51	41	1,126	1,122	851	4,470,093	2,714,012	1,803,271	58.5	27.4	24.4	32.3	0.4	31.8	147.9	64.7	50.5	.....
Paint and varnish.....	* 24	26	25	408	277	278	3,879,810	2,672,698	2,298,236	-4.0	-7.7	4.0	46.8	47.3	-0.4	68.8	45.2	16.3	.....
Stoves and furnaces, including gas and oil stoves.....	* 15	14	(*)	872	659	(*)	2,324,950	1,058,851	(*)	.....	7.1	.....	.....	32.3	.....	.....	119.6	.....
Coffee and spice, roasting and grinding.....	* 8	10	10	221	170	109	2,110,024	1,835,366	1,416,395	-20.0	-20.0	.....	102.8	30.0	66.0	49.0	15.0	29.6	.....
Confectionery.....	* 22	15	18	771	653	441	2,029,075	1,666,021	1,333,604	22.2	46.7	-16.7	74.8	18.1	48.1	52.1	29.4	17.6	.....

¹ A minus sign (-) denotes decrease. Percentages not shown where base is less than 100 for wage earners.
² Comparable figures not available.
³ Excluding statistics for two establishments, to avoid disclosure of individual operations.
⁴ Excluding statistics for one establishment, to avoid disclosure of individual operations.
⁵ Includes "bookbinding and blank-book making;" "engraving, steel and copper plate including plate printing;" and "lithographing."
⁶ Excluding statistics for three establishments, to avoid disclosure of individual operations.

The greatest absolute increase in value of products during the decade shown for any industry in the table is for slaughtering and meat packing—\$9,139,372, or 84.8 per cent. The greatest relative increase, 147.9 per cent, was reported for the manufacture of copper, tin, and sheet-iron products.

Among important industries that can not be shown at all in any tables without disclosing the operations of individual establishments are, in the order of their importance, the manufacture of roofing materials, mattresses and spring beds, paper goods, and cottonseed oil and cake.

BALTIMORE METROPOLITAN DISTRICT: 1909.



BALTIMORE METROPOLITAN DISTRICT.

Territory included.—The metropolitan district of Baltimore embraces 184,660 acres of territory, of which 19,290 acres constitute the area of Baltimore, and 165,370 acres the area of the outside territory. The population of the city of Baltimore proper in 1910 was 558,485, and that of the outside territory 100,230, the total for the district being 658,715.

As defined at the census of 1910, the metropolitan district comprised, in addition to the city of Baltimore, eight election districts, namely, Districts 1, 3, 9, 12, 13, 14, and 15, in Baltimore County, and District 5 in Anne Arundel County. The report for 1904 included all this territory but District 5.

On page 962 is an outline map of the metropolitan district as constituted in 1909, showing Baltimore and the election districts included.

Summary for the district.—Table 51 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910 for the Baltimore metropolitan district, for the city of Baltimore, and for the remainder of the district; the percentage which the figure for Baltimore represents of the total for the district being shown for each item.

Table 51	NUMBER OR AMOUNT.			Per cent Baltimore is of total for district.
	The district.	Baltimore.	District exclusive of Baltimore.	
Population ¹	658,715	558,485	100,230	84.8
Number of establishments.....	2,668	2,602	166	93.8
Persons engaged in manufactures.....	94,954	83,473	11,481	87.9
Proprietors and firm members.....	2,790	2,660	130	95.3
Salaried employees.....	10,339	9,369	970	90.6
Wage earners (average number).....	81,825	71,444	10,381	87.3
Primary horsepower.....	125,080	76,764	48,316	61.4
Capital.....	\$199,735,181	\$164,436,758	\$35,298,423	82.3
Expenses.....	237,569,865	168,914,786	68,655,079	71.1
Services.....	48,585,334	41,741,875	6,843,459	85.9
Salaries.....	11,888,229	10,571,088	1,317,141	88.9
Wages.....	36,697,105	31,170,787	5,526,318	84.9
Materials.....	165,085,541	107,023,883	58,061,658	64.8
Miscellaneous.....	23,898,990	20,149,028	3,749,962	84.3
Value of products.....	260,213,324	186,977,710	73,235,614	71.9
Value added by manufacture.....	95,127,783	79,953,827	15,173,956	84.0

¹ April 15, 1910.

In 1909 the Baltimore metropolitan district had 2,668 manufacturing establishments, which gave employment to an average of 94,954 persons during the year, and paid out \$48,585,334 in salaries and wages. Of the persons employed 81,825 were wage earners. These establishments turned out products to the value of \$260,213,324, to produce which materials costing \$165,085,541 were utilized. The value added by manufacture was thus \$95,127,783. The Baltimore

district ranked eleventh in 1909 among all the metropolitan districts of the United States in the value of its manufactured products.

In the Baltimore district, as in most of the other districts, the greater part of the value of the manufactured products of the district was reported by factories within the central city. Baltimore contained more than four-fifths (84.8 per cent) of the population of the district of which it is the manufacturing, commercial, and financial center, and contributed a little more than seven-tenths (71.9 per cent) of the value of products for the district. Its manufacturing establishments constituted over nine-tenths (93.8 per cent) of all in the district, and gave employment to nearly nine-tenths (87.3 per cent) of the wage earners.

As there are no incorporated places in any of the election districts, separate figures are not given for any places except Baltimore, although Sparrow Point and Canton are of much industrial importance. For the steel works, blast furnaces, steelshipbuilding plant, and coke ovens at Sparrow Point a combined value of products was reported for 1909 reaching into the millions. A large value of products was also reported for a copper smelter and refinery and for a petroleum refinery at Canton. None of these industries can be reported separately, as to do so would disclose the operations of individual establishments.

Comparison with earlier censuses.—Table 52 is a comparative summary of the statistics for the district as a whole for 1909, 1904,¹ and 1899,¹ together with the percentages of increase from census to census. For purposes of accurate comparison the statistics have been adjusted by segregating the figures of the territory added since 1904.

The percentages of increase in all items, except capital and miscellaneous expenses, were greater for the later five-year period, 1904–1909, than during the period 1899–1904. The percentages of increase during the decade 1899–1909 were especially large in salaries, salaried employees, and miscellaneous expenses. The average number of wage earners increased 12.4 per cent and their wages 38.9 per cent, a rate of gain not equal to that in value of products—45.4 per cent. The rate of increase in primary horsepower from 1904 to 1909 was 16.1 per cent. Statistics as to the primary power used in 1899 are not available.

¹ Bureau of the Census: Industrial Districts, 1905, p. 50.

Table 52

	NUMBER OR AMOUNT.					PER CENT OF INCREASE. ¹		
	1909			1904	1899	1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ²					
Population.....	³ 658,715	³ 7,767	³ 650,948	(⁴)	⁵ 577,670	12.7		
Number of establishments.....	2,668	13	2,655	2,243	2,352	12.9	18.4	-4.6
Persons engaged in manufactures.....	94,954	1,351	93,603	81,235	(⁶)		15.2	
Proprietors and firm members.....	2,790	6	2,784	2,506	(⁶)		11.1	
Salaried employees.....	10,339	93	10,246	7,297	5,744	78.4	40.4	27.0
Wage earners (average number).....	81,825	1,252	80,573	71,432	71,688	12.4	12.8	-0.4
Primary horsepower.....	125,080	3,066	122,014	105,063	(⁶)		16.1	
Capital.....	\$199,735,181	\$3,047,558	\$196,687,623	\$166,770,882	\$122,009,527	61.2	17.9	36.7
Expenses.....	237,569,865	2,810,937	234,758,928	180,810,209	154,392,949	52.1	29.8	17.1
Services.....	48,585,334	557,770	48,027,564	36,648,368	32,298,174	48.7	31.0	13.5
Salaries.....	11,888,229	126,332	11,761,897	7,724,061	6,187,327	90.1	52.3	24.8
Wages.....	36,697,105	431,438	36,265,667	28,924,307	26,110,847	38.9	25.4	10.8
Materials.....	165,085,541	2,031,174	163,054,367	124,600,047	108,775,530	49.9	30.9	14.5
Miscellaneous.....	23,898,990	221,993	23,676,997	19,561,794	13,319,245	77.8	21.0	46.9
Value of products.....	260,213,324	2,951,340	257,261,984	202,659,272	176,909,124	45.4	26.9	14.6
Value added by manufacture.....	95,127,783	920,166	94,207,617	78,059,225	68,133,594	38.3	20.7	14.6

¹ A minus sign (-) denotes decrease.² Figures in this column used in computing percentages of increase.³ April 15, 1910.⁴ No population census in 1905.⁵ June 1, 1900.⁶ Figures not available.

The proportions of the population and manufactures in the outside territory of the district are in general increasing, as is indicated by Table 53. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904.

Table 53

	PER CENT TERRITORY OUTSIDE OF BALTIMORE IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904	1899
Population.....	14.2	(²)	10.5
Number of establishments.....	5.8	3.6	3.3
Persons engaged in manufactures.....	10.8	8.6	(³)
Proprietors and firm members.....	4.5	3.0	(³)
Salaried employees.....	8.6	6.7	4.2
Wage earners (average number).....	11.3	8.7	7.1
Primary horsepower.....	37.1	38.3	(³)
Capital.....	16.4	10.8	12.1
Expenses.....	28.0	27.0	24.4
Services.....	13.1	10.7	9.1
Salaries.....	10.1	8.3	5.1
Wages.....	14.0	11.4	10.0
Materials.....	34.4	35.0	30.8
Miscellaneous.....	14.9	6.8	9.1
Value of products.....	27.3	25.2	23.6
Value added by manufacture.....	15.1	9.6	12.1

¹ Based on figures for district as constituted in 1904 and 1899.² No population census in 1905.³ Figures not available.

The proportion of the population of the district reported from the territory outside of Baltimore increased from 10.5 per cent in 1900 to 14.2 per cent in 1910, while the proportion of the value of products increased from 23.6 per cent in 1899 to 25.2 per cent in 1904 and to 27.3 per cent in 1909.

Leading industries.—Table 54 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

Among the 30 industries shown separately in the table there are 6 for which totals for the district can not be published, because to do so would disclose individual operations; and 9 which were not carried on in the part of the district which is outside the corporate limits of Baltimore. In all these cases the statistics shown are figures for the city of Baltimore exclusively.

As shown in the table, the manufacture of men's clothing is the leading industry in the Baltimore district and is wholly within the city of Baltimore, the value of the products amounting in 1909 to 13.9 per cent of the value of products for all industries. Another leading industry is the smelting and refining of copper, but it can not be presented without disclosure of individual operations.

Two industries—copper, tin, and sheet-iron products and slaughtering and meat packing—have substantially the same proportion of the district's value of products—5.5 and 5.2 per cent, respectively. Other industries of nearly as great importance are the manufacture of foundry and machine-shop products and of tobacco products.

SUMMARY FOR THE BALTIMORE METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

Table 54

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All industries.....	2,668	94,864	2,790	10,339	81,825	125,080	\$169,736,161	\$11,666,229	\$36,667,105	\$165,085,541	\$23,698,960	\$260,213,324	\$95,127,783
Belting and hose, woven and rubber. Boots and shoes, including cutstock and findings.....	4	315	1	35	279	305	825,720	48,785	87,068	995,018	119,463	1,317,601	322,483
Bread and other bakery products.....	14	670	11	65	594	252	677,706	64,484	239,242	612,172	146,576	1,431,017	518,845
Canning and preserving.....	410	2,429	432	296	1,701	1,010	2,733,849	187,643	780,407	3,795,757	461,778	6,970,981	2,176,224
Carriages and wagons and materials.....	57	3,893	68	264	3,571	2,368	4,325,220	266,053	936,271	4,821,265	384,402	6,626,225	1,704,960
Cars and general shop construction and repairs by steam-railroad companies.....	43	511	49	37	426	429	668,577	37,193	241,716	285,768	46,113	750,703	464,936
Clothing, men's, including shirts.....	18	4,481	.....	318	4,163	6,318	3,471,038	229,111	2,705,389	4,383,393	46,986	7,364,880	2,981,487
Clothing, women's.....	324	20,670	453	1,621	18,596	3,785	19,283,106	1,767,616	7,326,304	20,672,395	3,862,384	36,269,212	15,596,817
Coffee and spice, roasting and grinding.....	69	2,953	99	282	2,572	348	1,685,753	270,207	878,116	2,279,483	491,341	4,333,171	2,053,688
Confectionery.....	15	332	14	149	169	531	954,593	178,410	77,213	2,430,610	73,052	2,877,712	447,102
Copper, tin, and sheet-iron products.....	50	1,867	45	258	1,564	1,416	2,700,836	277,460	468,707	3,116,303	427,610	5,011,253	1,894,950
Foundry and machine-shop products.....	65	5,265	58	628	4,679	4,642	21,648,215	685,039	1,868,361	9,350,634	1,126,767	14,360,235	4,999,601
Fertilizers.....	16	1,460	5	227	1,228	3,685	7,989,458	374,653	642,662	6,175,708	529,740	8,489,656	2,293,948
Furniture and refrigerators.....	111	5,040	99	508	4,433	6,708	9,323,414	665,348	2,582,872	5,427,002	1,237,951	10,961,564	5,534,562
Glass.....	23	543	30	79	434	60	395,207	67,200	137,453	491,754	56,787	896,783	399,029
Hats, straw.....	34	1,358	48	153	1,157	1,786	1,824,983	145,388	547,704	1,013,594	210,269	2,197,239	1,183,705
Ice, manufactured.....	4	842	6	38	798	310	706,073	57,147	404,379	179,585	64,376	850,545	671,010
Leather goods.....	7	1,808	4	110	1,694	930	2,607,298	295,635	637,648	1,783,214	294,920	3,347,330	1,564,116
Liquors, distilled.....	12	242	1	46	196	5,102	1,964,302	65,432	161,028	222,110	172,731	693,828	471,718
Liquors, malt.....	135	410	40	64	306	181	610,078	54,872	142,634	560,318	83,622	963,019	402,701
Lumber and timber products.....	13	306	2	76	228	1,817	3,560,272	147,330	110,375	811,438	2,507,907	3,681,619	2,870,181
Marble and stone work.....	15	936	6	148	782	5,688	7,808,729	316,998	636,045	1,385,223	1,934,429	5,017,878	3,632,455
Paint and varnish.....	53	2,501	62	204	2,235	6,147	3,062,107	217,208	971,147	3,284,547	283,372	5,230,404	1,945,857
Patent medicines and compounds and druggists' preparations.....	52	895	49	82	764	1,428	1,234,894	158,302	499,130	783,025	148,701	1,759,724	976,699
Printing and publishing.....	12	190	20	43	127	450	502,670	35,198	54,982	699,514	127,358	1,000,938	301,424
Shipbuilding, including boat building.....	171	1,813	53	680	1,180	667	4,056,157	744,013	425,844	2,136,457	925,660	5,470,690	3,334,133
Slaughtering and meat packing.....	243	4,189	229	1,074	2,886	3,203	5,640,382	1,201,885	1,758,476	2,234,055	1,374,766	7,579,430	5,345,375
Tobacco manufactures.....	113	616	11	50	555	3,563	2,077,571	66,744	340,326	260,087	127,403	871,470	611,383
Umbrellas and canes.....	52	1,316	60	227	1,029	2,976	3,776,659	264,194	601,631	11,479,830	481,626	13,653,693	2,173,863
All other industries.....	220	3,866	244	319	3,303	559	6,450,005	369,280	1,170,929	5,537,513	2,535,263	10,288,867	4,751,354
	9	640	15	111	614	96	827,463	144,271	167,745	1,075,854	136,879	1,649,810	573,956
	609	22,597	586	2,347	19,664	59,231	76,364,846	2,476,180	9,165,312	66,502,025	3,479,768	89,432,247	22,930,222

¹ Excluding statistics of establishments located outside the corporate limits of Baltimore, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and had a value of products amounting to \$2,000,000 or more in 1909 are given in Table 55 for 1909, 1904, and 1899.

COMPARATIVE SUMMARY FOR THE BALTIMORE METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES:
1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
										Number of establishments.			Wage earners (average number).			Value of products.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Clothing.....	393	181	213	21,168	14,565	13,923	\$40,602,383	\$23,341,141	\$23,349,392	84.5	117.1	-15.0	52.0	45.3	4.6	73.9	43.3	21.4
Men's, including shirts.....	324	130	155	18,596	12,823	12,044	36,269,212	25,276,257	20,842,738	109.0	149.2	-16.1	54.4	45.0	6.5	74.0	43.5	21.3
Women's.....	69	51	58	2,572	1,742	1,879	4,333,171	3,064,884	2,506,654	19.0	35.3	-12.1	36.9	47.6	-7.3	72.9	41.4	22.3
Copper, tin, and sheet-iron products.....	65	² 50	² 59	4,679	2,512	2,745	14,350,235	8,608,602	5,933,166	10.2	30.0	-15.3	70.5	86.3	-8.5	141.9	66.7	45.1
Slaughtering and meat packing.....	52	44	50	1,029	562	466	13,653,693	6,847,973	6,476,918	4.0	18.2	-12.0	120.8	83.1	20.6	110.8	99.4	5.7
Foundry and machine-shop products.....	111	87	(*)	4,333	4,622	(*)	10,961,564	9,561,706	(*)	.....	27.6	.....	.....	-6.3	.....	.....	14.6	.....
Tobacco manufactures.....	220	288	324	3,303	3,650	4,027	10,288,867	10,545,035	9,581,893	-32.1	-23.6	-11.1	-18.0	-9.5	-9.4	7.4	-2.4	10.1
Liquors.....	28	30	22	1,010	876	659	8,699,297	6,206,447	4,175,569	27.3	-6.7	36.4	53.3	15.3	32.9	108.3	40.2	48.6
Malt.....	15	16	12	782	655	538	5,017,678	4,185,170	2,934,028	25.0	-6.3	33.3	45.4	19.4	21.7	71.0	19.9	42.6
Distilled.....	13	14	10	228	221	121	3,681,619	2,021,277	1,241,541	30.0	-7.1	49.0	88.4	3.2	82.6	196.5	82.1	62.8
Fertilizers.....	16	15	19	1,228	930	762	8,469,666	5,562,156	3,895,437	-15.8	6.7	-21.1	61.2	32.0	22.0	117.4	52.3	42.8
Printing and publishing.....	243	208	222	2,886	2,445	2,873	7,579,430	5,648,462	4,942,851	9.5	16.8	-6.3	0.5	18.0	-14.9	53.3	34.2	14.3
Book and job.....	151	124	142	1,675	1,276	1,178	3,491,225	2,164,562	2,037,037	6.3	21.8	-12.7	42.2	31.3	8.3	71.4	61.3	6.3
Newspapers and periodicals.....	53	56	44	600	667	1,179	3,049,576	2,662,307	2,186,437	20.5	-5.4	27.3	-49.1	-10.0	-43.4	39.5	14.5	21.8
All other printing and publishing industries ⁴	39	28	36	611	502	516	1,038,629	821,593	719,377	8.3	39.3	-22.2	18.4	21.7	-2.7	44.4	26.4	14.2
Cars and general shop construction and repairs by steam railroad companies.....	² 8	7	6	4,163	3,712	2,438	7,364,890	4,777,818	3,529,959	33.3	14.3	-16.7	70.8	12.1	52.3	108.6	54.1	35.4
Canning and preserving.....	57	50	48	3,571	4,197	5,680	6,526,225	6,410,929	10,791,369	18.8	14.0	4.2	-37.1	-14.9	-26.1	39.5	1.8	-40.6
Bread and other bakery products.....	410	352	350	1,701	1,475	1,437	5,970,981	4,539,180	3,896,376	17.1	16.5	0.6	18.4	15.3	2.6	61.5	31.5	22.8
Patent medicines and compounds and druggists' preparations.....	² 71	² 67	57	1,180	954	956	5,470,590	4,750,493	3,195,665	24.6	6.0	17.5	23.4	23.7	-0.2	71.2	15.2	48.7
Lumber and timber products.....	58	39	41	2,235	1,624	1,681	5,230,404	3,425,350	3,428,781	41.5	48.7	-4.9	33.0	37.6	-3.4	52.6	52.7	-0.1
Confectionery.....	50	43	42	1,564	1,049	858	5,011,253	2,597,943	1,923,939	19.0	16.3	2.4	82.3	49.1	22.3	160.5	92.9	35.0
Hats, straw.....	7	6	(*)	1,694	1,139	(*)	2,347,330	2,035,519	(*)	.....	15.7	.....	.....	48.7	.....	.....	15.3	.....
Furniture and refrigerators.....	² 34	⁵ 38	² 36	1,157	1,776	1,627	2,197,239	2,854,496	2,660,610	-5.6	-10.5	5.6	-28.9	-34.9	9.2	-18.3	-23.0	6.1

¹ A minus sign (-) denotes decrease.

² Excluding statistics for one establishment, to avoid disclosure of individual operations.

³ Comparable figures not available.

⁴ Includes "printing and publishing, music;" "bookbinding and blank-book making;" "engraving, steel and copper plate, and plate printing;" and "lithographing."

⁵ Excluding statistics for two establishments, to avoid disclosure of individual operations.

The greatest absolute increase in value of products during the decade, \$15,426,474, or 74 per cent, is shown for the manufacture of men's clothing. The greatest relative increase, 196.5 per cent, was reported for the manufacture of distilled liquors.

The inclusion of the 1909 statistics for establishments within the territory added to the district since 1904 affects considerably the totals for the fertilizer and canning and preserving industries, and to a much smaller degree those for lumber and timber products.

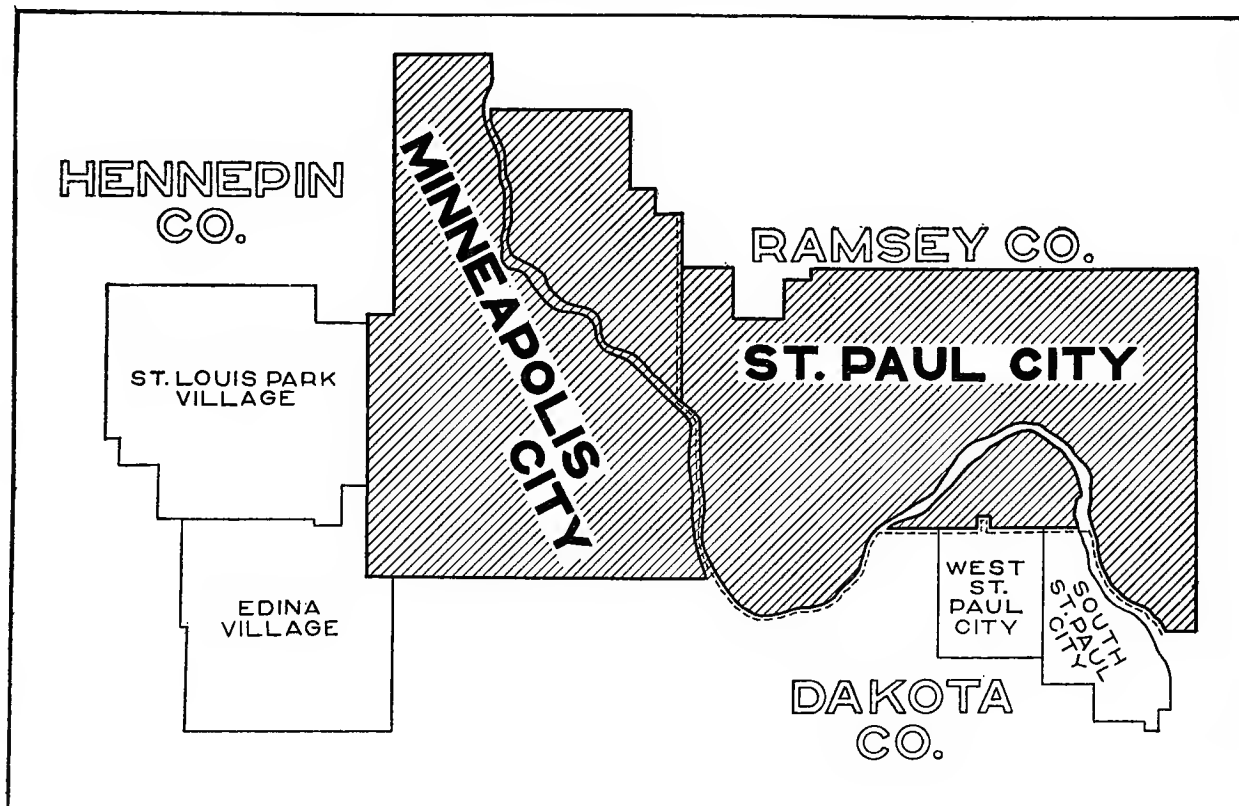
MINNEAPOLIS-ST. PAUL METROPOLITAN DISTRICT.

Territory included.—The Minneapolis-St. Paul metropolitan district embraces 94,539 acres, of which 32,069 acres represent the area of Minneapolis, 33,390 acres the area of St. Paul, and 29,080 acres the area of the outside territory. The population of Minneapolis in 1910 was 301,408, that of St. Paul 214,744, and that of the outside territory 10,104, the total for the district being 526,256. As defined at the census of 1910 the Minneapolis-St. Paul metropolitan district comprises, in addition to the cities of Minneapolis and St. Paul, the villages of Edina and St. Louis Park in Hennepin County and the cities of South St. Paul and West St. Paul in Dakota County. The territory

comprised within the Minneapolis-St. Paul industrial district as constituted for the bulletin on industrial districts for 1904 did not include South St. Paul and West St. Paul cities, but it contained in addition to the other places named above, Brooklyn, Crystal Lake, Richfield (now Richfield village), and St. Anthony townships and Robbinsdale and West Minneapolis villages in Hennepin County and New Canada and Rose townships and North St. Paul village in Ramsey County.

The location of each of the places included in 1909 is indicated on the following outline map of the district:

MINNEAPOLIS-ST. PAUL METROPOLITAN DISTRICT: 1909.



Summary for the district.—Table 56 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the Metropolitan-St. Paul district, for the cities of Minneapolis and St. Paul, and for the remainder of the district; the percentages which the figures for Minneapolis and St. Paul separately represent of the total for the district being shown in the case of each item.

In 1909 the Minneapolis-St. Paul metropolitan district had 1,844 manufacturing establishments, which

gave employment to an average of 59,920 persons during the year and paid out \$38,596,508 in salaries and wages. Of the persons employed, 48,268 were wage earners. These establishments turned out products to the value of \$244,339,598, to produce which materials were used costing \$166,823,348. The value added by manufacture was thus \$77,516,250. The Minneapolis-St. Paul district ranked twelfth in 1909 among the metropolitan districts of the United States in the value of its manufactured products.

Table 56

	NUMBER OR AMOUNT.				PER CENT OF TOTAL FOR DISTRICT.	
	The district.	Minneapolis.	St. Paul.	District exclusive of Minneapolis and St. Paul.	Minneapolis.	St. Paul.
Population ¹	526,256	301,408	214,744	10,104	57.3	40.8
Number of establishments.....	1,844	1,102	719	23	59.8	39.0
Persons engaged in manufactures.....	59,920	33,923	23,530	2,467	56.6	39.3
Proprietors and firm members.....	1,674	1,012	649	13	60.6	38.8
Salaried employees.....	9,978	5,949	3,542	487	59.6	35.5
Wage earners (average number).....	48,268	26,962	19,339	1,967	55.9	40.1
Primary horsepower.....	119,219	89,247	26,204	3,768	74.9	22.0
Capital.....	\$160,628,295	\$90,382,225	\$80,466,777	\$9,779,293	56.3	37.6
Expenses.....	225,488,583	153,760,750	52,772,885	18,954,948	68.2	23.4
Services.....	38,596,508	21,915,335	14,999,780	1,681,393	56.8	38.9
Salaries.....	10,871,801	6,277,221	4,048,175	546,405	57.7	37.2
Wages.....	27,724,707	15,638,114	10,951,605	1,134,988	56.4	39.5
Materials.....	166,823,348	119,993,135	30,299,634	16,530,579	71.9	18.2
Miscellaneous.....	20,068,727	11,852,280	7,473,471	742,976	59.1	37.2
Value of products.....	244,339,598	166,404,680	58,990,025	19,944,893	67.7	24.1
Value added by manufacture.....	77,516,250	45,411,545	28,690,391	3,414,314	58.6	37.0

¹ April 15, 1910.

The percentages which the combined statistics for the central cities represent of the total for the metropolitan district are larger in the majority of instances than those for any of the other metropolitan districts, although those for Cleveland and Detroit are larger in a number of items. The percentage is not less than 90 for any item, the range being from 90.1 per cent for cost of materials to 99.3 per cent for proprietors and firm members. The two cities contained 98.1 per cent of the population of the district and contributed over nine-tenths (91.8 per cent) of the value of the manufactured products of the district.

Comparison with earlier censuses.—Table 57 gives statistics for the district for 1909, 1904, and 1899.

For purposes of comparison the statistics in this table are grouped in such a way as to show separately for 1909 figures for (1) the territory added to the district since 1904 (South St. Paul and West St. Paul) and (2) the remainder of the district; and for 1904 and 1899 figures for (1) the territory deducted since 1904 (Brooklyn, Crystal Lake, Richfield, and St. Anthony townships, together with Robbinsdale and West Minneapolis villages, in Hennepin County and New Canada and Rose townships and North St. Paul village in Ramsey County) and (2) the remainder of the district. Percentages of increase are shown for the territory included in the metropolitan district in both 1909 and 1904.

Table 57

	NUMBER OR AMOUNT.									PER CENT OF INCREASE.		
	1909			1904			1899			1899-1909	1904-1909	1899-1904
	Total.	Territory added since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹	Total.	Territory deducted since 1904.	Remainder of district. ¹			
Population.....	\$ 526,256	\$ 7,170	\$ 519,086	\$ 473,762	\$ 12,354	\$ 461,408	\$ 377,467	\$ 9,610	\$ 367,857	41.1	12.5	25.4
Number of establishments.....	1,844	10	1,834	1,506	11	1,495	1,340	8	1,332	37.7	22.7	12.2
Persons engaged in manufactures.....	59,920	1,785	58,135	44,297	947	43,350	(5)	(5)	(5)	.....	34.1	.....
Proprietors and firm members.....	1,674	3	1,671	1,423	7	1,416	(5)	(5)	(5)	.....	18.0	.....
Salaried employees.....	9,978	352	9,626	5,830	156	5,674	4,390	110	4,280	124.9	69.7	32.6
Wage earners (average number).....	48,268	1,430	46,838	37,044	784	36,260	33,755	865	32,890	42.4	29.2	10.2
Primary horsepower.....	119,219	2,799	116,420	90,111	1,010	89,101	(5)	(5)	(5)	.....	30.7	.....
Capital.....	\$160,628,295	\$5,822,520	\$154,805,775	\$108,209,964	\$4,233,052	\$103,976,912	\$79,283,521	\$2,213,377	\$77,070,144	100.9	48.9	34.9
Expenses.....	225,488,583	17,441,729	208,046,854	148,422,314	1,473,728	146,948,586	112,570,667	1,411,631	111,159,036	87.2	41.6	32.2
Services.....	38,596,508	1,212,495	37,384,013	25,142,703	606,469	24,536,234	19,406,751	500,418	18,906,333	97.7	52.4	29.8
Salaries.....	10,871,801	358,349	10,513,452	5,994,418	197,803	5,796,615	4,158,905	109,253	4,049,652	169.6	81.4	43.1
Wages.....	27,724,707	854,146	26,870,561	19,148,285	408,666	18,739,619	15,247,846	391,165	14,856,681	80.9	43.4	26.1
Materials.....	166,823,348	15,976,889	150,847,459	109,364,757	676,400	108,688,357	85,836,668	730,113	85,106,555	77.2	38.8	27.7
Miscellaneous.....	20,068,727	253,345	19,815,382	13,914,854	190,859	13,723,995	7,327,248	181,100	7,146,148	177.3	44.4	92.0
Value of products.....	244,339,598	18,420,484	225,919,114	161,803,453	1,613,133	160,190,320	126,613,742	1,512,417	125,101,325	80.6	41.0	28.0
Value added by manufacture.....	77,516,250	2,444,595	75,071,655	52,438,696	936,733	51,501,963	40,777,074	782,304	39,994,770	87.7	45.8	28.8

¹ Figures in this column used in computing percentages of increase.
² April 15, 1910.

³ State census, June 1, 1905.
⁴ June 1, 1900.

⁵ Figures not available.

The relative increase in all the items for which comparative figures are given in the table, except miscellaneous expenses, was larger during the more recent five-year period, 1904-1909, than during the period 1899-1904. For the decade as a whole the relative increase was much greater in miscellaneous expenses, number of salaried employees, and salaries than for any other items. The average number of

wage earners increased 42.4 per cent during this period, but the amount paid for wages increased 80.9 per cent, a rate of gain approximately equal to that in value of products, 80.6 per cent. The relative increase from 1904 to 1909 in the amount of primary power of all kinds used was 30.7 per cent. Statistics as to the amount of primary power used in 1899 are not available.

The proportions which the population and statistics of manufacturing industries of the territory outside Minneapolis and St. Paul represented of the total for the area comprised in the district in both 1909 and 1904 are shown in Table 58. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904 and those for 1904 and 1899 upon the figures for the district exclusive of the territory subsequently deducted.

The proportion which the population of the territory outside of Minneapolis and St. Paul, but within the area comprised in the district, represented of the total for that area was the same for 1899 and 1909, while the proportion of the value of manufactured products of that area which was reported from such outlying territory decreased from five-tenths of 1 per cent in 1899 to four-tenths of 1 per cent in 1904 but increased to seven-tenths of 1 per cent in 1909. The percentages for all but one of the other items also decreased from 1899 to 1904, but increased from 1904 to 1909. The decade shows a steady increase.

Table 58

	PER CENT TERRITORY OUTSIDE OF MINNEAPOLIS-ST. PAUL IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904 ²	1899 ³
Population.....	0.6	0.5	0.8
Number of establishments.....	0.7	0.3	0.5
Persons engaged in manufactures.....	1.2	0.6	(3)
Proprietors and firm members.....	0.6	0.2	(3)
Salaried employees.....	1.4	0.7	1.0
Wage earners (average number).....	1.1	0.6	0.8
Primary horsepower.....	0.8	0.6	(3)
Capital.....	2.6	1.4	1.6
Expenses.....	0.7	0.4	0.5
Services.....	1.3	0.7	1.1
Salaries.....	1.8	1.0	1.5
Wages.....	1.0	0.6	1.0
Materials.....	0.4	0.3	0.3
Miscellaneous.....	2.5	0.8	0.4
Value of products.....	0.7	0.4	0.6
Value added by manufacture.....	1.3	0.8	0.9

¹ Based on figures for district as constituted in 1909, exclusive of territory added since 1904.

² Based on figures for district as constituted in 1904, exclusive of territory deducted since 1904.

³ Figures not available.

Leading industries.—Table 59 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

SUMMARY FOR THE MINNEAPOLIS-ST. PAUL METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

Table 59

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horsepower.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All industries.....	1,844	69,920	1,874	9,978	48,268	119,219	\$160,828,295	\$10,871,801	\$27,724,707	\$186,823,348	\$20,088,727	\$244,339,598	\$77,618,250
Agricultural implements.....	110	573	1	72	500	735	1,332,094	75,702	340,985	669,946	172,438	1,509,533	839,587
Artificial stone.....	148	464	61	33	370	205	375,324	22,758	224,511	188,657	37,789	548,573	379,916
Boots and shoes, including cut stock and findings.....	9	2,195	2	175	2,018	849	3,818,742	253,106	1,032,575	3,235,194	454,960	5,144,543	1,909,359
Boxes, fancy and paper.....	7	610	2	60	648	423	905,807	86,040	225,038	451,585	93,379	968,606	517,021
Bread and other bakery products.....	1169	1,663	185	214	1,264	800	4,138,935	229,472	734,041	2,779,432	531,370	4,973,477	2,193,995
Butter, cheese, and condensed milk.....	13	151	10	64	77	859	379,707	41,614	56,072	2,529,913	99,675	2,794,601	264,688
Canning and preserving.....	12	297	11	58	228	164	647,038	62,884	86,082	704,914	69,172	976,454	270,540
Carriages and wagons and materials.....	134	429	23	51	345	427	708,643	57,130	222,114	331,280	63,311	818,207	484,927
Cars and general shop construction and repairs by steam-railroad companies.....	10	5,251	.....	269	4,982	5,195	8,281,634	274,391	3,440,205	4,183,112	51,308	7,949,016	3,765,904
Clothing, men's, including shirts.....	30	1,906	37	179	1,690	331	1,783,787	194,565	567,982	2,255,321	183,342	3,628,281	1,272,960
Confectionery.....	21	671	20	153	498	319	806,287	175,093	170,473	985,288	185,502	1,609,356	624,068
Cooperage and wooden goods, not elsewhere specified.....	19	656	14	41	601	981	908,045	49,308	327,045	1,128,795	77,484	1,699,792	570,997
Copper, tin, and sheet-iron products.....	78	1,121	71	138	914	424	2,570,297	138,272	545,411	1,074,716	196,800	2,220,929	1,146,213
Electrical machinery, apparatus, and supplies.....	13	232	3	42	187	205	427,208	54,141	100,751	220,183	60,722	526,101	305,918
Flour-mill and gristmill products.....	13	3,594	8	1,309	2,279	50,698	19,869,105	1,295,351	1,530,425	70,952,696	3,448,932	78,669,808	7,717,112
Food preparations.....	25	605	21	104	380	710	1,390,247	207,593	191,180	2,442,238	382,883	3,723,829	1,281,591
Foundry and machine-shop products.....	144	5,758	94	880	4,784	7,032	13,208,513	993,031	3,082,677	5,786,604	1,355,040	12,394,257	6,607,653
Fur goods.....	31	1,219	34	190	995	272	2,122,533	218,632	641,092	2,123,248	367,886	3,620,482	1,497,234
Furniture and refrigerators.....	42	1,451	35	152	1,264	1,877	2,865,578	181,191	734,299	1,512,522	258,107	2,940,460	1,427,938
Leather goods.....	23	661	15	114	532	312	1,097,459	124,528	288,657	1,005,254	131,092	1,720,326	715,072
Liquors, malt.....	7	1,445	1	374	1,070	3,390	13,374,264	431,436	627,709	1,454,486	2,817,920	7,081,277	5,626,791
Lumber and timber products.....	151	5,990	30	311	5,649	14,628	13,235,052	506,919	3,189,933	8,961,605	961,248	13,186,892	6,225,287
Marble and stone work.....	20	568	17	56	495	871	919,304	60,380	387,007	560,349	57,377	1,174,074	613,725
Patent medicines and compounds and druggists' preparations.....	77	799	62	443	294	417	2,138,966	238,478	122,082	614,867	756,789	2,119,126	1,504,259
Printing and publishing.....	1329	6,258	374	2,044	3,840	3,963	9,934,236	1,934,362	2,509,881	3,215,188	2,649,703	12,298,881	9,083,693
Slaughtering and meat packing.....	16	1,311	13	364	1,434	3,043	6,130,705	373,870	868,347	17,213,913	299,775	19,819,223	2,605,310
Tobacco manufactures.....	1109	1,142	114	124	904	27	1,057,660	188,760	479,924	722,874	349,714	2,002,089	1,279,215
All other industries.....	484	12,500	408	1,966	10,126	20,162	46,400,825	2,404,793	5,098,209	31,538,128	3,964,009	48,324,405	16,785,277

¹ Excluding statistics for establishments located outside of the corporate limits of Minneapolis and St. Paul, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

² Excluding statistics for establishments located outside of the corporate limits of Minneapolis, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Among the 27 industries shown separately in the table are 8 for which the totals for the district can not be published because to do so would disclose indi-

vidual operations. Of the remaining industries only two were carried on in the part of the district which is outside the corporate limits of Minneapolis and St. Paul.

The principal industry of the Minneapolis-St. Paul metropolitan district is the manufacture of flour-mill products; the industry, however, with the exception of two establishments in St. Paul, was confined to Minneapolis in 1909.

The value of products reported by the flour mills of Minneapolis alone was \$78,669,808, as shown in the table, and constituted 56.5 per cent of the total for the industry in the state, and 32.2 per cent of the value of all products for the district.

Other important industries, arranged according to the value of products in 1909, were slaughtering and meat packing, the lumber industry, foundries and machine shops, printing and publishing, steam-railroad repair shops, and breweries. The manufacture of linseed oil and that of bags, other than paper bags, industries for which separate statistics can not be published without disclosing individual operations, were also of considerable importance.

Comparative summary, by industries.—The number of establishments, average number of wage earners, and

value of products for such of the industries as can be shown separately and had a value of products amounting to \$2,000,000 or more in 1909, are given in Table 60 for 1909, 1904, and 1899.

The greatest absolute increase in value of products during the decade is shown for the flour-mills and gristmills, amounting to \$29,000,190, or 58.4 per cent; comparisons for this industry, however, are affected to some extent by the omission of establishments from the figures for the different censuses in order to avoid disclosing the operations of individual concerns. The statistics for slaughtering and meat packing are incomparable because of the fact that in the territory added to the district subsequent to 1904 the operations in this industry were of large magnitude and the figures for this added area in 1904 and 1899 are not included in the table. Omitting this industry from consideration, the greatest relative gain in value of products during the decade was for food preparations, 491.1 per cent, followed by butter, cheese, and condensed milk, with 283 per cent.

COMPARATIVE SUMMARY FOR THE MINNEAPOLIS-ST. PAUL METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES: 1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
										Number of establishments.			Wage earners (average number).			Value of products.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Flour-mill and gristmill products....	² 13	² 12	³ 11	2,279	2,227	2,066	\$78,669,808	\$62,754,446	\$49,669,618	18.2	8.3	9.1	10.3	2.3	7.8	58.4	25.4	26.3
Slaughtering and meat packing.....	16	16	7	1,434	109	89	19,819,223	1,186,256	1,288,484	128.6	.....	128.6	.....	1,215.6	.....	1,438.2	1,570.7	-7.9
Lumber and timber products.....	² 51	² 49	² 39	5,649	5,324	6,715	13,186,892	11,969,297	15,576,737	30.8	4.1	25.6	-1.2	6.1	-6.8	-15.3	10.2	-23.2
Foundry and machine-shop products.	144	103	(⁴)	4,784	3,198	(⁴)	12,394,257	7,792,439	(⁴)	.....	39.8	.....	.....	49.6	.....	.....	89.1	.....
Printing and publishing.....	² 329	303	266	3,840	3,059	2,767	12,298,881	8,654,736	6,271,356	23.7	8.6	13.9	38.8	25.5	10.6	96.1	42.1	38.0
Newspapers and periodicals.....	² 120	139	124	1,710	1,226	1,489	7,698,366	5,159,432	4,053,462	-3.2	-13.7	12.1	14.8	39.5	-17.7	87.5	47.3	27.3
Book and job.....	178	143	120	1,791	1,579	943	4,053,347	3,063,893	1,694,748	48.3	24.5	19.2	89.9	13.4	67.4	139.2	32.3	80.8
All other printing and publishing industries ⁵	31	21	22	339	254	335	647,168	431,411	523,146	40.9	47.6	-4.5	1.2	33.5	-24.2	23.7	50.0	-17.5
Cars and general shop construction and repairs by steam-railroad companies.....	10	7	² 11	4,982	3,459	2,669	7,949,016	4,372,590	3,637,325	-9.1	42.8	-36.4	86.7	44.0	29.6	118.6	81.8	20.2
Liquors, malt.....	7	10	11	1,070	632	470	7,081,277	3,869,531	2,843,013	-36.4	-30.0	-9.1	127.7	69.3	34.6	149.1	83.0	36.1
Boots and shoes, including cut stock and findings.....	9	² 10	² 9	2,018	1,470	1,596	5,144,543	2,839,425	2,654,006	.....	-10.0	11.1	26.4	37.3	-7.9	93.8	81.2	7.0
Bread and other bakery products.....	² 169	111	102	1,264	1,026	744	4,973,477	3,531,280	2,163,157	65.7	62.3	8.8	69.9	23.2	37.9	129.9	40.8	63.2
Food preparations.....	25	14	17	380	261	183	3,723,829	1,471,051	630,004	47.1	78.6	-17.6	107.6	45.6	42.6	491.1	153.1	133.5
Fur goods.....	31	26	18	995	1,177	730	3,620,482	3,253,165	1,940,188	72.2	19.2	44.4	36.3	-15.5	61.2	86.6	11.3	67.7
Clothing, men's, including shirts.....	30	22	31	1,690	1,315	1,820	3,528,281	2,328,879	2,303,224	-3.2	36.4	-29.0	-7.1	28.5	-27.7	53.2	51.5	1.1
Furniture and refrigerators.....	42	² 36	² 23	1,264	1,064	792	2,940,460	1,965,257	1,382,825	82.6	16.7	56.5	59.6	18.8	34.3	112.6	49.6	42.1
Butter, cheese, and condensed milk..	13	² 16	20	77	71	72	2,794,601	711,566	729,633	-35.0	-18.8	-20.0	.....	.....	.....	283.0	292.7	-2.5
Copper, tin, and sheet-iron products.	78	68	40	914	791	740	2,220,929	1,647,725	1,583,966	95.0	34.6	45.0	23.5	15.5	6.9	40.2	34.8	4.0
Patent medicines and compounds and druggists' preparations.....	77	² 52	33	294	223	119	2,119,126	2,232,368	663,612	133.3	48.1	57.6	147.1	31.8	87.4	219.3	-5.1	236.4
Tobacco manufactures.....	² 109	115	106	904	1,012	902	2,002,089	1,813,885	1,415,247	2.8	-5.2	8.5	0.2	-10.7	12.2	41.5	10.4	28.2

¹ A minus sign (-) denotes decrease. Percentages not shown where base is less than 100 for wage earners.

² Excluding statistics for two establishments, to avoid disclosure of individual operations.

³ Excluding statistics for one establishment, to avoid disclosure of individual operations.

⁴ Comparable figures not available.

⁵ Includes "printing and publishing, music;" "bookbinding and blank making;" "engraving, steel and copper plates, including plate printing;" and "lithographing."

SAN FRANCISCO-OAKLAND METROPOLITAN DISTRICT.

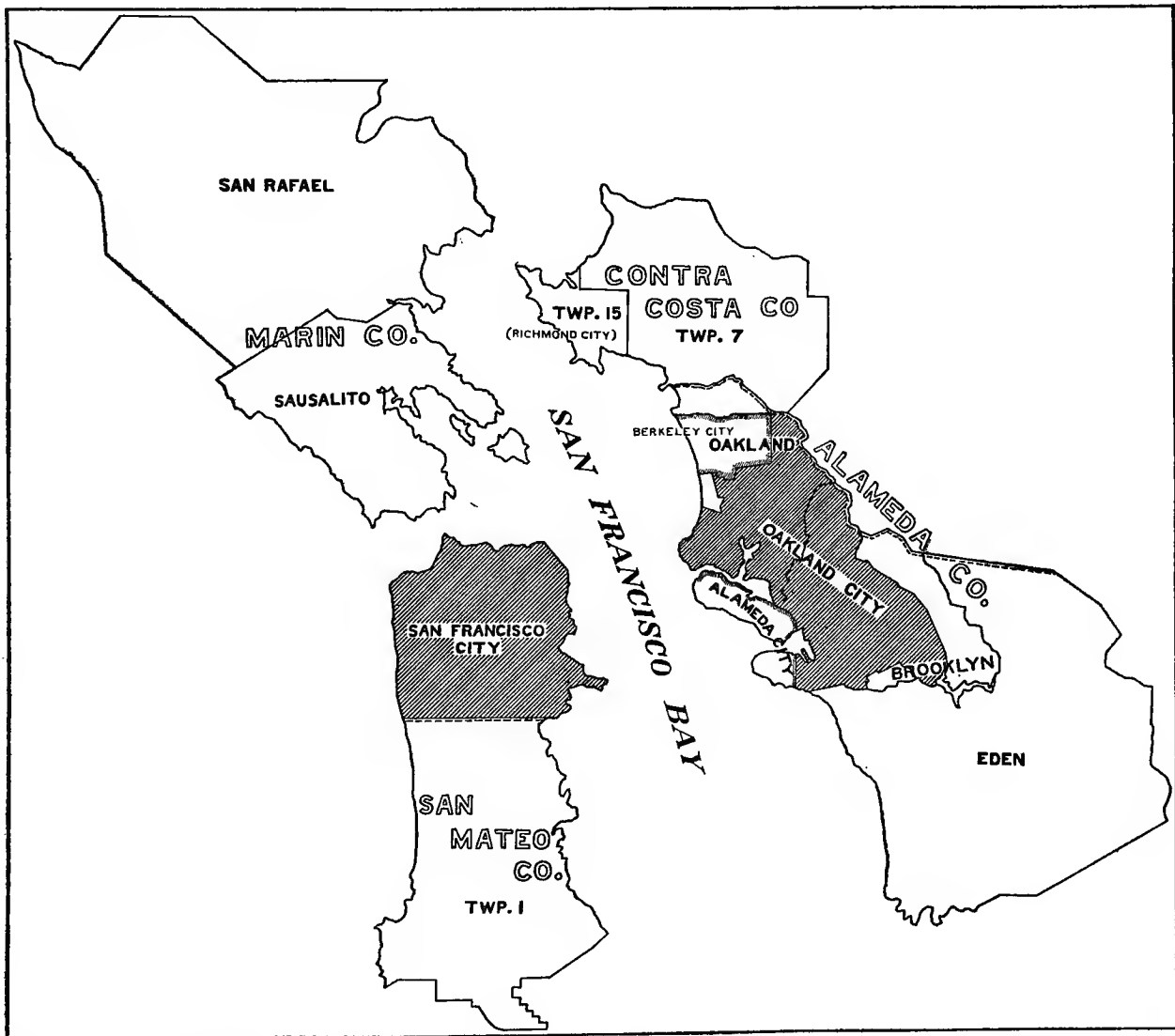
Territory included.—The San Francisco-Oakland metropolitan district embraces 289,381 acres of territory, of which 29,760 acres constitute the area of San Francisco, 29,248 acres the area of Oakland, and 230,373 acres the area of the outside territory. The population of the city of San Francisco in 1910 was 416,912, that of the city of Oakland 150,174, and that of the outside territory 119,787, the total for the district being 686,873.

As defined at the census of 1910, the metropolitan district comprised, in addition to the cities of San Francisco and Oakland, Alameda and Berkeley, with that part of Brooklyn township not included in Oak-

land city, and that part of Oakland township not included in Oakland and Berkeley; Eden township in Alameda County; townships 7 and 15 in Contra Costa County; San Rafael and Sausalito townships in Marin County; and township 1 in San Mateo County. The industrial district as constituted for the bulletin on industrial districts for 1904 and 1899 did not embrace Eden township in Alameda County or the townships in Contra Costa County and Marin County, but, in addition to the places mentioned, included part of township 2 of San Mateo County, including San Mateo city.

The following is an outline map of the metropolitan district as constituted in 1909:

SAN FRANCISCO-OAKLAND METROPOLITAN DISTRICT: 1909.



Summary for the district.—Table 61 is a summary for 1909 of the statistics of manufacturing industries, with a statement of the population in 1910, for the San

Francisco-Oakland district; for the cities of San Francisco, Oakland, Alameda, and Berkeley; and for the remainder of the district. The percentages which

the figures for San Francisco and Oakland separately represent of the total for the district are shown in the case of each item.

In 1909 the San Francisco-Oakland metropolitan district had 2,539 manufacturing establishments, which gave employment to an average of 53,177 persons during the year and paid out \$43,298,791 in salaries and wages. Of the persons employed, 41,615

were wage earners. These establishments turned out products to the value of \$199,593,117, to produce which materials costing \$117,440,976 were utilized. The value added by manufacture was thus \$82,152,141. The San Francisco-Oakland district ranked thirteenth in 1909 among the metropolitan districts discussed in this report in the value of its manufactured products.

Table 61

	NUMBER OR AMOUNT.							PER CENT OF TOTAL FOR DISTRICT.	
	The district.	San Francisco.	Oakland.	District exclusive of San Francisco-Oakland.				San Francisco.	Oakland.
				Total.	Alameda.	Berkeley.	Remainder.		
Population ¹	686,873	416,912	150,174	119,787	23,383	40,434	55,970	60.7	21.9
Number of establishments.....	2,539	1,796	441	302	51	84	167	70.7	17.4
Persons engaged in manufactures.....	53,177	36,910	8,598	7,729	1,076	1,420	5,233	69.4	16.1
Proprietors and firm members.....	3,390	2,544	554	292	50	115	127	75.0	16.3
Salaried employees.....	8,172	6,122	1,079	971	111	221	639	74.9	12.2
Wage earners (average number).....	41,615	26,242	6,905	6,466	915	1,084	4,467	67.9	16.6
Primary horsepower.....	81,821	49,934	13,693	18,204	1,526	2,433	14,245	61.0	16.7
Capital.....	\$187,701,402	\$133,823,673	\$19,113,246	\$34,764,488	\$3,002,220	\$3,464,693	\$28,297,570	71.3	10.2
Expenses.....	178,798,979	119,782,203	20,559,208	38,452,873	2,307,413	4,134,822	32,010,398	67.0	11.5
Services.....	43,298,791	30,467,015	6,617,538	6,214,238	967,839	1,094,255	4,152,144	70.4	15.3
Salaries.....	10,786,718	8,085,563	1,300,297	1,400,858	170,892	254,292	975,674	75.0	12.1
Wages.....	32,512,073	22,381,452	5,317,241	4,813,380	796,947	839,963	3,176,470	63.8	16.4
Materials.....	117,440,976	76,217,321	11,847,233	29,276,422	929,353	2,686,878	25,760,191	64.9	10.1
Miscellaneous.....	18,054,212	13,097,867	2,094,432	2,861,913	410,221	353,689	2,098,003	72.5	11.6
Value of products.....	199,593,117	133,041,069	22,342,926	44,209,122	2,654,417	4,435,374	37,219,531	69.7	11.2
Value added by manufacture.....	82,152,141	56,823,748	10,495,693	14,832,700	1,625,064	1,748,496	11,459,140	69.2	12.8

¹ April 15, 1910.

The greater part of the value of the manufactured products of the district was reported by factories within the central cities. San Francisco and Oakland combined contained over four-fifths (82.6 per cent) of the population of the district of which they are the manufacturing, commercial, and financial center, and contributed nearly eight-tenths (77.9 per cent) of the value of products. Their manufacturing establishments constituted 88.1 per cent of all in the district and gave employment to 84.5 per cent of the average number of wage earners for that area.

Of the two cities outside of San Francisco and Oakland for which statistics are given separately, Berkeley had the larger value of products, representing 2.2 per cent of the total for the metropolitan district. The population of Berkeley formed 5.9 per cent of the total for the district.

The average value of products per establishment was larger for San Francisco than for any other city of the district.

The group of eight townships or parts of townships not shown separately, with a combined population equal to 8.1 per cent of the total for the district, contributed 18.6 per cent of the value of the products.

The principal industries of San Francisco in 1909, as measured by value of products, were the refining of sugar, printing and publishing, slaughtering and meat packing, and foundries and machine shops; of Oakland, the lumber industry, and foundries and machine shops;

of Alameda, shipbuilding; and of Berkeley, foundries and machine shops.

Comparison with earlier censuses.—Table 62 is a comparative summary for the statistics for the San Francisco-Oakland district as a whole for 1909, 1904, and 1899, together with the percentages of increase from census to census.

For purposes of accurate comparison the statistics for 1909 have been adjusted by segregating the figures for the territory added since 1904; and those for 1904 by segregating the figures for the territory deducted since 1904. The figures for 1899, however, as published in the report for 1904, are not affected except as to population, no manufactures being reported for 1899 from the deducted territory.

The percentage of increase in all items shown, except capital and cost of materials, was greater during the earlier five-year period, 1899-1904, than during the period 1904-1909. The percentages of increase during the decade, 1899-1909, were much larger in salaries, miscellaneous expenses, capital, and number of salaried employees than in any other items. The average number of wage earners increased only 9.8 per cent during this period, but the amount paid for wages increased 62.9 per cent, a rate of gain approximately equal to that in value of products—65.9 per cent. The rate of increase in primary horsepower of all kinds from 1904 to 1909 was 50.5 per cent. Statistics as to the power used in 1899 are not available.

Table 62

	1909			1904			1899	PER CENT OF INCREASE. ¹		
	Total.	Territory added since 1904.	Remainder of district. ²	Total.	Territory deducted since 1904.	Remainder of district. ²	Total.	1899-1909	1904-1909	1899-1904
Population.....	686,873	41,066	645,807	(⁴)	(⁴)	(⁴)	450,549	43.3	.....	.....
Number of establishments.....	2,539	29	2,610	2,621	6	2,616	2,016	24.5	-4.1	29.8
Persons engaged in manufactures.....	53,177	664	52,513	64,256	44	54,212	(⁵)	(⁵)	-3.3	.....
Proprietors and firm members.....	3,390	17	3,373	3,373	8	3,365	(⁵)	(⁵)	0.2	.....
Salaried employees.....	8,172	68	8,104	6,008	3	6,006	3,801	113.2	35.0	58.0
Wage earners (average number).....	41,615	579	41,036	44,875	33	44,842	37,390	9.8	-8.5	19.9
Primary horsepower.....	81,821	993	80,828	53,772	.....	53,772	(⁵)	(⁵)	50.5	.....
Capital.....	\$187,701,402	\$2,155,186	\$185,546,216	\$119,442,395	\$46,300	\$119,396,095	\$79,054,236	134.7	55.4	51.0
Expenses.....	178,793,979	1,604,362	177,189,617	139,048,227	62,960	138,985,267	104,231,107	70.0	27.6	33.1
Services.....	43,298,791	443,947	42,854,844	36,432,676	32,529	36,400,147	24,098,021	77.7	17.7	61.3
Salaries.....	10,786,718	107,598	10,679,120	7,526,931	2,250	7,523,681	4,349,076	145.5	41.9	73.0
Wages.....	32,512,073	336,349	32,175,724	28,906,745	30,279	28,876,466	19,748,946	62.9	11.4	46.2
Materials.....	117,440,976	927,782	116,513,194	88,554,355	24,318	88,530,037	72,746,695	60.2	31.6	21.7
Miscellaneous.....	18,054,212	232,633	17,821,579	14,061,196	6,113	14,055,083	7,388,391	141.3	26.8	90.3
Value of products.....	199,593,117	1,781,468	197,811,649	159,035,080	75,857	158,957,223	119,240,348	65.9	24.4	33.3
Value added by manufacture.....	82,152,141	853,676	81,298,465	70,478,725	51,539	70,427,186	46,493,653	74.9	15.4	51.5

¹ A minus sign (-) denotes decrease.
² Figures in this column used in computing percentages of increase.
³ April 15, 1910.
⁴ No population census in 1905.
⁵ June 1, 1900. Excluding Township 2 of San Mateo County, not a part of the district in 1909; no manufactures were reported from this township.
⁶ Figures not available.

The proportions which the population and the statistics of manufacturing industries in the territory outside the central cities, but within the area comprised in the district, represent of the total for that area are shown in Table 63. The percentages for 1909 are based upon the figures for the district exclusive of the territory added since 1904, and those for 1904 and 1899 upon the figures for the district exclusive of the territory subsequently deducted.

Table 63

	PER CENT TERRITORY OUTSIDE OF SAN FRANCISCO AND OAKLAND IS OF TOTAL FOR DISTRICT.		
	1909 ¹	1904 ²	1899 ³
Population.....	12.2	(³)	9.1
Number of establishments.....	10.9	4.4	3.5
Persons engaged in manufactures.....	13.5	5.5	(⁴)
Proprietors and firm members.....	8.2	2.4	(⁴)
Salaried employees.....	11.1	7.1	3.3
Wage earners (average number).....	14.3	6.8	6.3
Primary horsepower.....	21.4	7.7	(⁴)
Capital.....	17.6	6.6	5.4
Expenses.....	20.8	8.1	5.9
Services.....	13.5	6.2	6.0
Salaries.....	12.1	6.4	4.0
Wages.....	13.9	6.2	5.5
Materials.....	24.4	9.3	6.2
Miscellaneous.....	14.8	5.1	2.9
Value of products.....	21.4	7.6	5.7
Value added by manufacture.....	17.2	5.5	5.0

¹ Based on figures for district as constituted in 1909, exclusive of territory added since 1904.
² Based on figures for district as constituted in 1904, exclusive of territory deducted since 1904.
³ No population census in 1905.
⁴ Figures not available.

The proportion of the population of the district as originally constituted that was reported for the terri-

tory outside of San Francisco and Oakland increased from 9.1 per cent in 1900 to 12.2 per cent in 1910, and the proportion of the value of products of the district that was contributed by the outlying territory increased steadily from 5.7 per cent in 1899 to 7.6 per cent in 1904, and 21.4 per cent in 1909. The great increase of the manufacturing activities in the outside area shown for the period 1904-1909 was due in part to the earthquake and fire in San Francisco in 1906.

Leading industries.—Table 64 gives statistics for 1909 for the industries of the district having products valued at \$500,000 or more, so far as separate figures can be presented.

Among the 38 industries shown separately in the table there are 6 for which totals for the district can not be published, because to do so would disclose individual operations; the statistics shown are for San Francisco exclusively. Four industries were not carried on in the part of the district outside the corporate limits of San Francisco-Oakland.

Of the industries shown separately, slaughtering and meat packing ranked highest in value of products, with 10.1 per cent of the total reported for all industries in the district, followed by printing and publishing with 7.1 per cent, and foundries and machine shops with 6.4 per cent. Three industries—canning and preserving and the lumber and bakery industries—each contributed 3.8 per cent of the total value of manufactured products for the district.

SUMMARY FOR THE SAN FRANCISCO-OAKLAND METROPOLITAN DISTRICT, BY INDUSTRIES: 1909.

INDUSTRY.	Number of establishments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse-power.	Capital.	Salaries.	Wages.	Cost of materials.	Miscellaneous expenses.	Value of products.	Value added by manufacture.
		Total.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).								
All industries.....	2,639	63,177	3,390	8,172	41,615	61,821	\$187,701,402	\$10,768,718	\$32,512,073	\$117,440,978	\$18,054,212	\$199,693,117	\$82,152,141
Boots and shoes, including cut stock and findings.....	18	425	73	31	321	131	672,102	35,632	203,853	552,976	65,039	976,361	423,385
Bread and other bakery products....	276	2,412	396	296	1,720	1,072	4,309,777	316,482	1,437,204	4,316,532	524,608	7,562,415	3,246,883
Butter, cheese, and condensed milk..	13	107	13	24	70	87	232,464	33,940	48,866	794,610	29,115	951,108	156,498
Canning and preserving.....	34	2,238	19	204	2,015	1,283	6,005,636	336,093	874,433	5,271,293	539,521	7,655,728	2,384,435
Carriages and wagons and materials..	50	386	58	41	287	457	575,853	45,470	246,763	265,611	79,969	739,594	474,083
Cars and general shop construction and repairs by steam-railroad companies.....	5	2,149	.....	69	2,080	1,662	1,058,406	86,414	1,873,033	2,367,923	76,408	4,403,791	2,035,858
Chemicals.....	10	210	2	37	171	1,063	2,023,781	52,946	127,426	678,109	141,633	1,134,647	456,538
Clothing, men's, including shirts....	54	2,051	252	140	1,659	390	1,747,342	132,644	755,629	2,164,598	380,012	3,812,513	1,647,915
Clothing, women's.....	51	994	296	69	629	95	501,035	73,395	277,756	719,824	117,067	1,347,079	627,255
Coffee and spice, roasting and grinding.....	19	492	13	254	225	775	2,440,324	427,071	152,607	3,548,908	521,158	4,972,739	1,423,831
Confectionery.....	36	878	44	177	657	358	1,386,567	185,043	308,192	1,116,962	255,220	2,066,469	960,507
Cooperage and wooden goods, not elsewhere specified.....	11	321	8	31	282	861	1,196,560	53,246	219,538	1,194,378	79,011	1,603,925	409,647
Copper, tin, and sheet-iron products.	87	1,493	152	187	1,174	1,077	5,786,774	237,321	1,034,631	2,290,663	325,267	4,309,247	2,018,684
Fertilizers.....	3	94	.....	13	81	420	885,985	20,726	56,656	785,645	34,146	940,344	154,699
Firearms and ammunition.....	3	176	.....	29	147	305	1,488,834	47,300	79,011	477,302	46,361	783,264	305,962
Flour-mill and gristmill products....	12	224	6	75	143	1,453	1,858,397	104,337	127,845	3,015,867	91,959	3,472,314	456,447
Food preparations.....	41	574	77	126	371	950	2,045,085	146,399	218,531	1,830,812	220,191	2,689,200	858,388
Foundry and machine-shop products	214	4,840	173	697	3,970	8,692	14,788,883	982,681	3,759,659	6,262,648	1,113,188	12,833,346	6,570,698
Furnishing goods, men's.....	13	109	4	28	77	3	241,964	20,510	42,650	368,386	56,789	564,368	195,982
Furniture and refrigerators.....	60	1,362	58	134	1,170	1,418	2,318,559	155,460	1,115,600	1,416,107	284,128	3,310,394	1,894,287
Gas and electric fixtures and lamps and reflectors.....	18	451	13	103	335	279	1,160,465	116,567	267,809	442,287	47,962	955,799	513,512
Gas, illuminating and heating.....	8	1,081	.....	348	733	2,670	23,076,810	428,277	683,089	1,368,099	868,880	4,473,761	3,108,662
Gloves and mittens, leather.....	14	377	16	62	299	29	684,496	72,128	159,214	318,628	66,275	675,328	356,700
Jewelry.....	124	587	125	32	430	248	221,460	36,937	366,894	501,922	107,477	1,121,151	619,229
Leather goods.....	23	370	20	51	299	173	740,730	55,628	212,008	371,130	91,676	886,615	518,485
Leather, tanned, curried, and finished.....	117	619	15	46	568	1,260	2,479,329	88,908	415,217	2,654,645	128,955	3,622,171	967,526
Liquors, malt.....	28	682	8	128	546	2,457	8,498,806	263,877	629,550	1,107,819	1,643,408	4,345,615	3,237,796
Lumber and timber products.....	124	2,996	88	316	2,592	11,116	5,438,090	463,348	2,367,874	3,917,645	492,367	7,575,745	3,658,100
Marble and stone work.....	32	679	34	105	540	1,460	1,317,191	146,134	459,854	844,245	197,611	1,779,134	934,889
Mattresses and spring beds.....	19	398	13	72	313	438	894,635	93,974	208,008	665,489	180,375	1,221,798	556,309
Oil, not elsewhere specified.....	5	101	10	17	74	279	658,065	21,745	54,099	1,010,529	38,027	1,173,865	163,336
Paint and varnish.....	21	427	8	82	337	1,013	2,058,808	113,770	227,626	2,074,346	116,865	2,947,617	873,271
Patent medicines and compounds and druggists' preparations.....	34	362	14	164	184	145	702,645	173,827	89,782	422,087	241,484	1,094,291	672,204
Printing and publishing.....	416	6,154	358	1,872	3,924	4,191	8,619,796	2,208,569	3,642,201	3,577,030	2,787,419	14,153,964	10,376,934
Shipbuilding, including boat building.....	23	1,759	22	97	1,640	2,457	7,846,946	174,263	1,405,652	1,031,730	789,925	3,594,350	2,562,020
Slaughtering and meat packing.....	43	1,063	66	190	817	2,080	5,969,267	288,306	485,929	16,918,049	539,741	20,203,050	3,285,001
Soap.....	11	108	12	24	72	290	489,166	41,121	56,526	554,581	79,610	827,020	272,439
Tobacco manufactures.....	130	1,314	376	79	850	71	956,893	91,854	479,498	698,656	434,911	2,043,154	1,544,498
All other industries.....	560	12,114	558	1,742	9,814	28,613	64,323,476	2,414,375	7,341,550	39,525,105	4,230,554	60,769,853	21,244,748

¹ Excluding statistics for establishments located outside of the corporate limits of San Francisco, to avoid disclosure of individual operations. The figures for these establishments are included under the head of "All other industries."

Comparative summary, by industries.—The number of establishments, average number of wage earners, and value of products for such of the industries as can be shown separately and had products valued at \$2,000,000 or more in 1909 are given in Table 65 for 1909, 1904, and 1899.

COMPARATIVE SUMMARY FOR THE SAN FRANCISCO-OAKLAND METROPOLITAN DISTRICT, BY SELECTED INDUSTRIES: 1909, 1904, AND 1899.

INDUSTRY.	NUMBER OF ESTABLISHMENTS.			WAGE EARNERS (AVERAGE NUMBER).			VALUE OF PRODUCTS.			PER CENT OF INCREASE. ¹								
										Number of establishments.			Wage earners (average number).			Value of products.		
	1909	1904	1899	1909	1904	1899	1909	1904	1899	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904	1899-1909	1904-1909	1899-1904
Slaughtering and meat packing.....	43	50	34	817	707	290	\$20,203,050	\$15,700,661	\$8,769,769	26.5	-14.0	47.1	181.7	15.6	143.8	130.4	28.7	79.0
Printing and publishing.....	416	420	280	3,924	4,016	2,968	14,153,964	11,781,800	6,895,670	48.6	-1.0	50.0	32.2	-2.3	35.3	105.3	20.1	70.9
Newspapers and periodicals.....	167	198	129	1,294	1,363	1,210	7,847,650	6,172,339	3,983,969	29.5	-15.7	53.5	6.9	-5.1	12.6	97.0	27.1	54.9
Book and job.....	219	186	125	1,877	1,770	1,232	4,478,321	4,052,202	2,103,098	75.2	17.7	48.8	52.4	6.0	43.7	112.9	10.5	92.7
All other printing and publishing industries ²	30	36	26	753	883	526	1,827,993	1,557,250	808,603	15.4	-16.7	38.5	43.2	-14.7	67.9	126.1	17.4	92.6
Foundry and machine-shop products.....	214	187	(4)	3,970	4,126	(4)	12,833,346	10,949,163	(4)	-	14.4	-	-3.8	-	-	-	17.2	-
Canning and preserving.....	34	41	37	2,015	1,765	1,667	7,655,728	5,111,865	3,530,713	-8.1	-17.1	10.8	20.9	14.2	5.9	116.8	49.8	44.8
Lumber and timber products.....	124	85	54	2,592	2,157	1,377	7,375,745	5,838,293	3,154,870	129.6	45.9	57.4	88.2	20.2	56.6	140.1	29.8	85.1
Bread and other bakery products.....	275	235	169	1,720	1,615	933	7,562,415	5,809,937	2,963,219	62.7	17.0	39.1	84.4	6.5	73.1	155.2	30.2	96.1
Clothing.....	105	132	149	2,288	3,361	4,016	5,159,592	6,437,287	6,284,007	-29.5	-20.5	-11.4	-43.0	-31.9	-16.3	-17.9	-19.8	2.4
Men's, including shirts.....	54	84	95	1,659	2,438	2,740	3,812,513	4,804,404	4,350,176	-43.2	-35.7	-11.6	-39.5	-32.0	-11.0	-12.4	-20.6	10.4
Women's.....	51	48	54	629	923	1,276	1,347,079	1,632,883	1,933,831	-5.6	6.3	-11.1	-50.7	-31.9	-27.7	-30.3	-17.5	-15.6
Coffee and spice, roasting and grinding.....	19	25	22	225	275	231	4,972,739	3,979,865	2,786,387	-13.6	-24.0	13.6	-2.6	-18.2	19.0	79.8	24.9	43.9
Gas, illuminating and heating.....	8	3	4	793	575	509	4,473,761	3,248,456	2,222,405	100.0	166.7	-	44.0	27.5	13.0	101.3	37.7	46.2
Liquors, malt.....	28	28	31	546	618	481	4,345,615	4,885,869	3,108,997	-9.7	-	-9.7	13.5	-11.7	28.5	39.8	-0.9	41.1
Copper, tin, and sheet-iron products.....	87	54	30	1,174	1,526	1,434	4,309,247	4,768,505	4,427,147	190.0	61.1	80.0	-18.1	-23.1	6.4	-2.7	-9.6	7.7
Leather, tanned, curried, and finished.....	17	24	26	558	638	621	3,622,171	2,937,510	3,066,355	-34.6	-29.2	-7.7	-10.1	-12.5	2.7	18.1	23.3	-4.2
Shipbuilding, including boat building.....	23	28	28	1,640	3,720	3,346	3,594,350	6,381,332	6,186,520	-17.9	-17.9	-	-51.0	-55.9	11.2	-43.9	-43.7	3.1
Flour-mill and gristmill products.....	12	13	11	143	248	202	3,472,314	3,852,041	2,164,112	9.1	-7.7	-18.2	-29.2	-42.3	22.8	60.4	-9.9	78.0
Furniture and refrigerators.....	60	49	22	1,170	842	496	3,310,394	1,899,576	880,363	172.7	22.4	122.7	135.9	39.0	69.8	276.0	74.3	115.8
Paint and varnish.....	21	13	9	337	271	36	2,947,617	2,196,656	447,619	133.3	61.5	44.4	-	24.4	-	558.5	34.2	390.7
Food preparations.....	41	43	28	371	266	219	2,689,200	1,024,058	746,895	46.4	-4.7	53.6	69.4	39.5	21.5	260.0	162.6	37.1
Confectionery.....	36	44	14	657	702	378	2,066,469	1,992,086	844,825	157.1	-18.2	214.3	73.8	-6.4	85.7	144.6	3.7	135.8
Tobacco manufactures.....	130	199	124	859	1,300	997	2,043,154	2,159,650	1,416,599	4.8	34.7	60.5	-13.8	-33.9	30.4	44.2	-5.4	52.4

¹ A minus sign (-) denotes decrease.
² Excluding statistics for two establishments, to avoid disclosure of individual operations.
³ Includes "printing and publishing, music;" "bookbinding and blank-book making;" "engraving, steel and copper plate, including plate printing;" and "lithographing."
⁴ Comparable figures not available.
⁵ Excluding statistics for one establishment, to avoid disclosure of individual operations.

The greatest absolute increase in value of products during the decade in the area under consideration, \$11,433,281, or 130.4 per cent, is shown for slaughtering and meat packing. The greatest relative increase shown for any of the industries included in the tables was reported for the manufacture of paint and varnish—558.5 per cent. Among the important industries that can not be shown separately, as to do so would disclose the operations of individual establishments, are the refining of sugar and of petroleum and the manufacture of explosives and of paper bags.



